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By L. H. Bailey

STUDIES IN PALMS

4. Brahea, and one Erythea
5. New palms in Panama, and others

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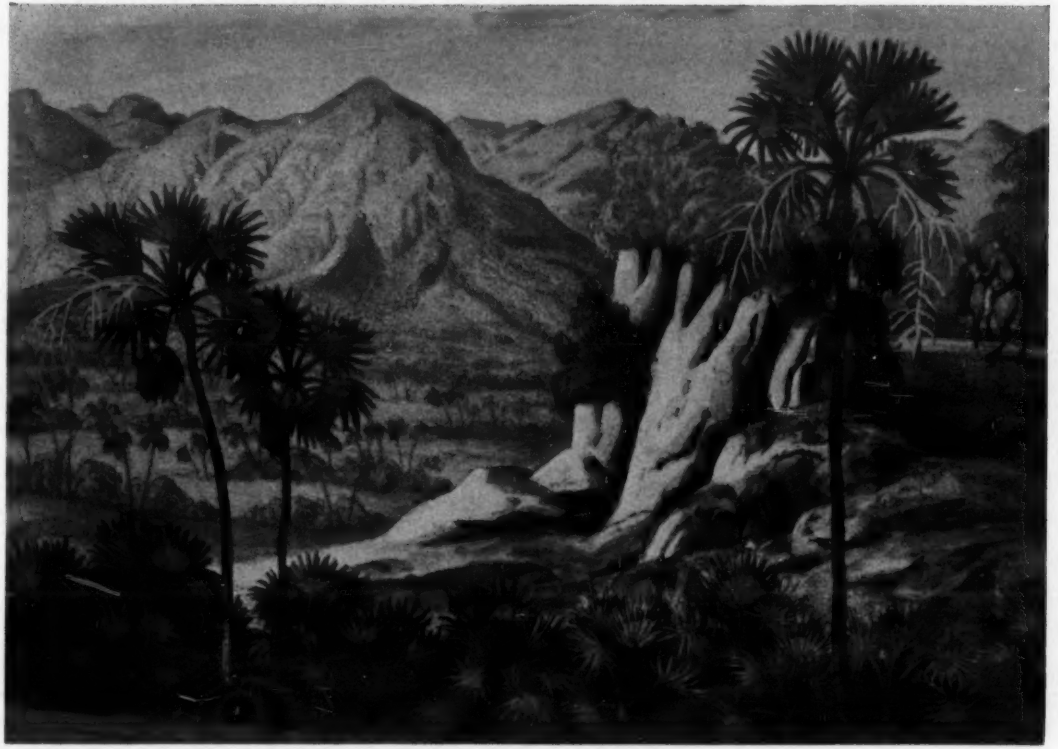


87. THREE TREES of *Brahea dulcis* in southern Mexico, with many young ones. Adapted from Martius.

Gmelina L. H. Bailey 7-4-23

ARTICLE 4.
BRAHEA, AND AN ERYTHEA.

Something more than six years ago I published notes on the Mexico-Guatemalan genus Brahea (Gent. Herb. iv, 119-125, 1937). It was not intended to "go so far as a monograph," and "only a cursory view" was undertaken. This "view" brought into position the previous partial treatments of the genus, and left much to the imagination. Since those days I have made important collections in Mexico, and inasmuch as the fleeting years do not allow me to tarry I now put my findings together: they are interesting.

These palms are apparently all calcicolous. They send their toes into the crevices of weatherworn limerock, perch on the pinnacles of limestone mountains, establish themselves in fields of limey stones. Persons have told me the young trees die when transferred to flat grounds about their houses, where alluvium has been deposited. They are inhabitants of dry regions, where prolonged droughts parch the ridges and hillsides. All these circumstances may explain the fact that Braheas are little known in cultivation, although palms called Brahea are planted in southern California and some of them may be true to genus.

8-31-43 EH

The Braheas are small fan-leaved spineless palms commonly of stiff appearance, with long branched flower-clusters that usually extend beyond the leaves, leaf-blades prominently plaited, minute hermaphrodite flowers seldom seen in full expansion, and little lozenge-like fruits provided with a more or less succulent exterior and with plane albumen. Trunks are often oblique at the base, the wood is hard, the exterior is ringed with scars of fallen leaves; the height of the tree seldom exceeds 25 or 30 feet, and sometimes the stature is bush-like. In one species the trunk is often prostrate and sprouts arise from it. The bluish color of the foliage should make them attractive on premises, wherever they can thrive and may be allowed to grow slowly in their natural habit. In their native regions the leaves are much used for thatch, and apparently also in the making of hats and other woven work, and fruits of some kinds said to have an edible exterior pulp: one may see steps or notches cut in the trunk to make ascension easy.

The only name I have heard for these palms in Mexico is palmito, which means *little palm*, although other names are recorded. I have made no effort to propose an English name because I could not find one briefer or more euphonious than the botanical nomen, which I pronounce Brà-hea.

B.H.P

This name comes, of course, in compliment to the memory of Tycho Brahe, Danish astronomer, 1546–1601, "summo Astronomo" as Martius explains it when he founded the genus in 1838 at a time when some of the palms were dignified by the names of great personages, as Socratea, Copernicia, Maximiliana, Leopoldina. If persons desire a vernacular, however, they may like "soyal," which I adapted from Martius in my former Brahea paper.

Inasmuch as the genus Brahea is old, new species of fan palms were referred to it as they were discovered, as Brahea species themselves were first assigned to Corypha. Later as the plants became better known and their separateness established, new genera were proposed and the species transferred; thus it comes that Brahea names are synonyms in Washingtonia and Erythea.

BRAHEA, Martius, Hist. Nat. Palm. iii, 243 (1838).

Spineless erect or reclining trees of small or medium size, fan-leaved, hermaphrodite: palmate leaf-blades stiff in aspect, the folds at base closely pressed together in a plicate way, more or less tomentose particularly when young, often glaucous and bluish in color; petiole flattened, edges sharply toothed or plain: spadices long and compound, interfoliar, usually exceeding the leaves, bearing nodifronds but not contained in cymbas, the panicles at each node about 3-branched, rachillæ terete and curved or straight and at first tomentose and not presenting definite flower attachments, the flowers more or less spirally arranged; flower-buds appearing immersed but seen to be little indented when the tomentum sheds, the buds becoming prominent and remaining long before anthesis; flowers minute, calyx and corolla each deeply 3-lobed (sepals and petals each connate at base); stamens 6, about equalling the petals in length; anthers short, dorsifixed; filaments broadly expanded at base to form a cup, and sometimes also midway; pistil stout, 3-carpelled, tapering to a prominent point, more or less expanded and angled at base: fruit commonly simple but sometimes double or triple, small, drupe-like and indehiscent, 2 cm. or less in length, outer flesh meager, exterior brown or gray-brown to blackish, in young stage commonly conspicuously pubescent or tomentose, usually unequal-sided and oblong in shape but often narrowly obovoid when dry, straightish on ventral side and curved on dorsal side, with minute point at oblique apex, 1-seeded but often with 1 or 2 abortive or undeveloped locules; seed oblong or at first nearly globular, very hard, albumen hard and plane (not ruminate), embryo nearly or quite opposite the raphe, micropyle large, lateral or subapical.

Brahea was a genus of only one species to Martius, with flowers placed singly on the rachilla. Subsequently palms with clustered flowers were added but Bartlett in an excellent analysis in 1935 restored the genus to its original concept, and he referred the others to Acœlorraphe, a name I have felt obliged reluctantly to subjugate to Paurotis (Gent. Herb. iv,

364, 1940), so that new combinations of names will be required when sufficient material accumulates for satisfactory definition of the species.

If a person is to identify the Braheas he must be told that the ordinary herbarium specimens do not suffice. The material must represent the plant, even if it requires much space for storage and facilities for handling.

Following are key contrasts, and other characters, distinguishing the Braheas:

A. Spadices very diffuse and commonly exceeding the foliage, with long curved rachillæ many of which are 15–20 cm. long and spaced wide apart on the axis; anthers sessile. The spadix condition is particularly marked before the flower-buds emerge, as in Fig. 91.

B. Petiole usually margined with stout curved hard callous teeth: flower-buds and flowers not pubescent-tomentose: filaments conspicuous on leaf.

C. Flower-buds (exterior of calyx and corolla) at period just preceding anthesis practically closed and pointed at apex, strongly nerved: fruit large, about 2 cm. long.....1. *B. dulcis*

CC. Flower-buds somewhat open and retuse at apex, not strongly nerved: fruit not known.....2. *B. Conzattii*

BB. Petiole not toothed on margin: flower-buds pubescent-tomentose: filaments absent or not conspicuous on leaf.....3. *B. calcarea*

AA. Spadices of many compact panicles that bear nearly or quite straight more or less rigid rachillæ usually 10 cm. or less long, the whole spadix with peduncle shorter or longer than foliage; anthers on distinct filaments above the basal stamen-cup: flower-buds not pubescent: fruit (as far as known) less than 2 cm. long.

B. Leaves prominently glaucous-blue, at least underneath.

C. Petiole commonly provided with short straight marginal teeth: leaf-blade at or near base and petiole prominently flocculent-tomentose; filaments many on leaf: petals erect or strongly ascending at anthesis: fruit not known.....4. *B. Berlandieri*

CC. Petiole not toothed: leaf and petiole not tomentose: peduncle excessively long: filaments on leaf usually few and short: flower-buds crowded but not clustered at each node, distinctly not sunken in rachis: pistil with pubescent ring at middle: petals wide-spreading or retrorse at full expansion: fruit 17 mm. or less long...5. *B. prominens*

BB. Leaves green, more or less glossy, not glaucous or tomentose; petiole scarcely if at all toothed; filaments many on leaf: petals ascending or erect at anthesis: fruit about 12–13 mm. long.....6. *B. bella*

1. **Brahea dulcis,** Martius, op. cit. 244, tt. 137, 162 (1838). Figs. 87, 88, 89, 90, 91, 92A, 93A, 94A.

Corypha dulcis, HBK. Nov. Gen. et Sp. i, fol. ed. 240 (1815), small ed. 300 (1816).

Trunk or trunks stout, erect or decumbent, 2–7 m. tall or long and 15–30 cm. thick, base usually oblique, wood heavy and hard, soon bare and roughly ringed; coma or crown of several or many upright and horizontal narrowly fingered stiff leaves, and also old dead or dying leaves hanging

from the under side and not yet fallen: leaves palmate, circular in general outline, 50–70 cm. across, dull or bluish in color but usually hardly glaucous, cut one-half or more to the base of the blade into 30 and more narrow segments that are 2–3 cm. broad below the split into two divisions, midrib prominent and the lateral faces closely lined lengthwise on both surfaces with slender veins, blade glabrous unless bearing fluffy deciduous tawny tomentum in folds at base, filaments usually many; petiole flat on upper surface, mildly convex or rounded underneath, 15–35 mm. broad and 75 cm. or more long, often flocculent-tomentose at first, the two margins beset with single or double spinose callous curved teeth 2–4 mm. long; hastula a brief transverse ending of the petiole irregularly margined with a more or less broken scarious brown membrane: spadix often 1 m. and more long, interfoliar, much exceeding the leaves, bearing tubular striate nodifronds at each joint, diffusely branched, the slender more or less curved very light colored and at first tomentose-pubescent rachillæ 5–15 cm. long and about 2 mm. thick when dried; young rachillæ provided with brownish scales in the tomentum marking the alternate places where flowers will later appear; flower-buds before anthesis 1–2 mm. long, divaricate, pointed, remaining somewhat open at apex for a time before expansion, placed singly but close together, not pubescent or tomentose, the base slightly sunken in the axis; flowers more or less 1 mm. long at anthesis; calyx-lobes somewhat rounded and imbricate; corolla deeply 3-parted, the pointed lobes concave and at the apex holding the short anthers the filaments of which are much expanded and connate at base: fruit single, or sometimes double or triple and connate at base, about 16 or 17 mm. long when fresh but perhaps only 12 mm. long when dried, grayish-brown, beetle-shaped with a flat front and rounded back, apical point curved to the front, cupule very small, exterior with thin flesh; seed filling the cavity and conforming to it, with a podium or brown substance extending toward the center and joined to the wall or micropyle opposite the embryo, the large micropyle opening on or near the dorsal side at about the middle or toward the top; albumen white and plane.

Southern Mexico, from States Guerrero, Oaxaca and Vera Cruz and presumably in intermediate regions, on hard dry hills and mountains, exact distribution not determined. The species varies greatly in stature and habit. On sterile hills in central Guerrero, near Chilpancingo (now Ciudad Bravo), Petaquilla and Philpancingo, I have seen much of it as a bent or prostrate tree with trunk about 6 feet long and sprouts arising from the bole. On higher elevations near Taxco, 5,000 to 5,500 feet, in Guerrero, I have taken it as a tree more than 20 feet tall with nearly straight and erect trunk, and I have visited similar areas of it in the neighborhood of Palmar, many kilometers from Jalapa, in mountains in the State of Vera Cruz. The colonies of dwarf bent and crooked trees in the Chilpancingo region look at first to be different species from the tall erect trees on higher altitudes, but I have not been able to find diagnostic differences even though I sometimes see small variation in shape of fruit. *B. dulcis* is planted in the city of Oaxaca.

A singular circumstance may have confused persons who have observed this challenging palm. In the Taxco territory I have taken fruits much larger than the ones I have described, perhaps as much as 2 cm. long when dry, and with a very conspicuous open micropyle. On opening these fruits one finds the seed reduced to powder, and the pericarp about it is much enlarged. Sometimes the micropyle is closed, and then one is likely to find a beetle completely occupying the seed-coats, the insect having become entombed at its last transformation. These big fruits are essentially insect galls.

Typification of *B. dulcis* is difficult. Even if old collections were available they might not be sufficient for the purpose. The description by Martius is good, as also his plates. It is a plant of southern Mexico. The picture of the trees in his plate 162, which he says was drawn in Mexico by L. B. de Karwinski, is undoubtedly the plant one may see to this day on the hills of Guerrero and other regions, even though the detail may not be critical; I have reproduced these trees in Fig. 87. I am not certain that some of the early collections of *B. dulcis* by Liebmann and others really belong to this species.

88. INDIVIDUAL TREE of *Brahea dulcis* in mountains beyond Jalapa, State of Vera Cruz, southern Mexico, as shown by the camera.

Both HBK under *Corypha dulcis* and Martius under *Brahea dulcis*

include the acaulescent and prominently caulescent plants in one species variable to the conditions under which it grows. I have taken the tall erect tree shown in Fig. 87 as type of the species, in case subsequent discovery discloses that we really have two species passing as one. This drawing was apparently made from trees growing in province Mizteca, which

89. Trees of Brahea dulcis growing under difficult conditions, in the State of Guerrero, southern Mexico.

my friend and correspondent Professor Maximino Martinez of Mexico City tells me is in the northwestern part of the present State of Oaxaca.

Readers of the early accounts may find the locality "near Chilpantzingo and Masatlan"; this latter place is not the Mazatlan in Sinaloa, near the mouth of Golfo de California, prominent on the maps, but a small village in Guerrero through which one may now pass on the way from Taxco to Acapulco.

2. **Brahea Conzattii,** Bartlett, in Publ. no 461, Carnegie Inst. Wash. 30 (1935). Fig. 93B.

Imperfectly known, differing from *B. dulcis* in larger flower-buds which before anthesis are retuse at apex, the petals not conniving closely so there is a hole or depression, the petals less prominently nerved: rachillæ apparently shorter.

On Cuesta (hill) de Salomé, Oaxaca, Mexico, altitude 1,000 feet, *C. Conzatti 1717*, represented by a sheet in the National Herbarium, Washington, with which I am familiar. Bartlett contrasted the species also on the well-armed petiole, "having taken *Ortega 5630* from Sinaloa and *Liebmann 10799* from Puebla as typical *B. dulcis*"; Ortega 5630, however, is *B. bella* which has a nearly or quite unarmed petiole, and the Liebmann specimen does not show a petiole but a drawing of *B. dulcis* made by him

90. BRAHEA DULCIS on exposed dry hillsides, sprouting from the base. Trunk of the rear one has been notched, for climbing. Guerrero.

91. SPADIX PANICLE OF BRAHEA DULCIS, showing the slender curved rachillæ just before anthesis. Guerrero. About one-half natural size.

(of which I have a photograph) shows an armed petiole; and this verifies the description in Martius.

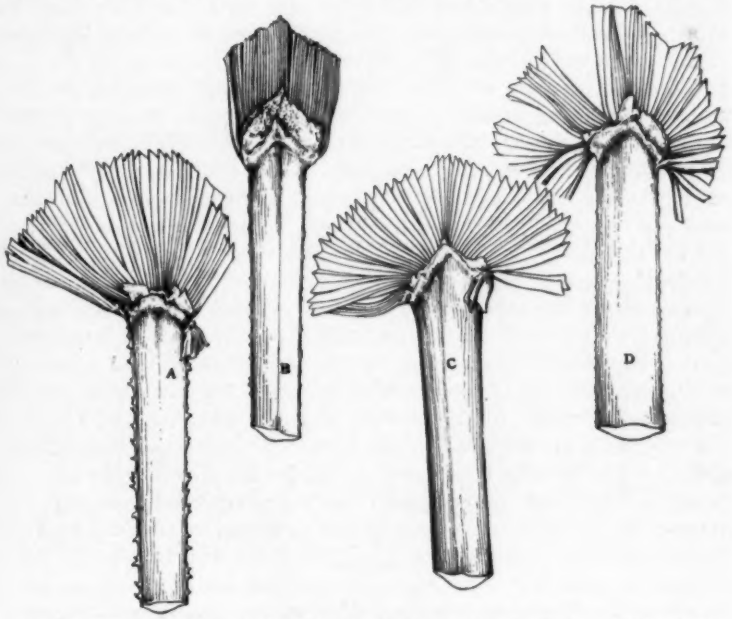
Conzatti no. 1717 is also in his own herbarium in the city of Oaxaca, southern Mexico, where I examined it in 1940 and from which he gave me fragments. A young virgin tree was in his garden brought by him (as a seed or a root my notes do not say) from Salomé; it looked to me like *B. dulcis*. Sr. Conzatti told me he probably could not recognize *B. Conzattii* were he to go again to Cuesta de Salomé, among the many Braheas in the region.

I do not now pass on the validity of *Brahea Conz ttii*. The picture to which I gave that title, Fig. 73 in my former paper, is *B. dulcis*.

3. **Brahea calcarea,** Liebm. ex Martius, Hist. Nat. Palm. iii, 319 (1850). F gs. 93C, 94B.

B. nitida, André, in Rev. Hort. 1887, 344, figs. 67–70, apud Becc.

Differs from *B. dulcis*, according to Liebmann, in taller trunk (20 feet), leaf-blade flabellately multiparted and bifid, filaments none, petiole glabrous and margins entire, spadices much longer (10 feet), branchlets



92. Hastulas of Brahea, nearly one-half natural size. A, *Brahea dulcis;* B, *B. Berlandieri;* C, *B. prominens;* D, *B. bella.*

flexuose and pendulous and much longer (6–7 inches). It is assumed that the species is in other respects like *B. dulcis*. The habitat is recorded as in calcareous mountains, 2,000 feet, Xalcomulco, Mexico.

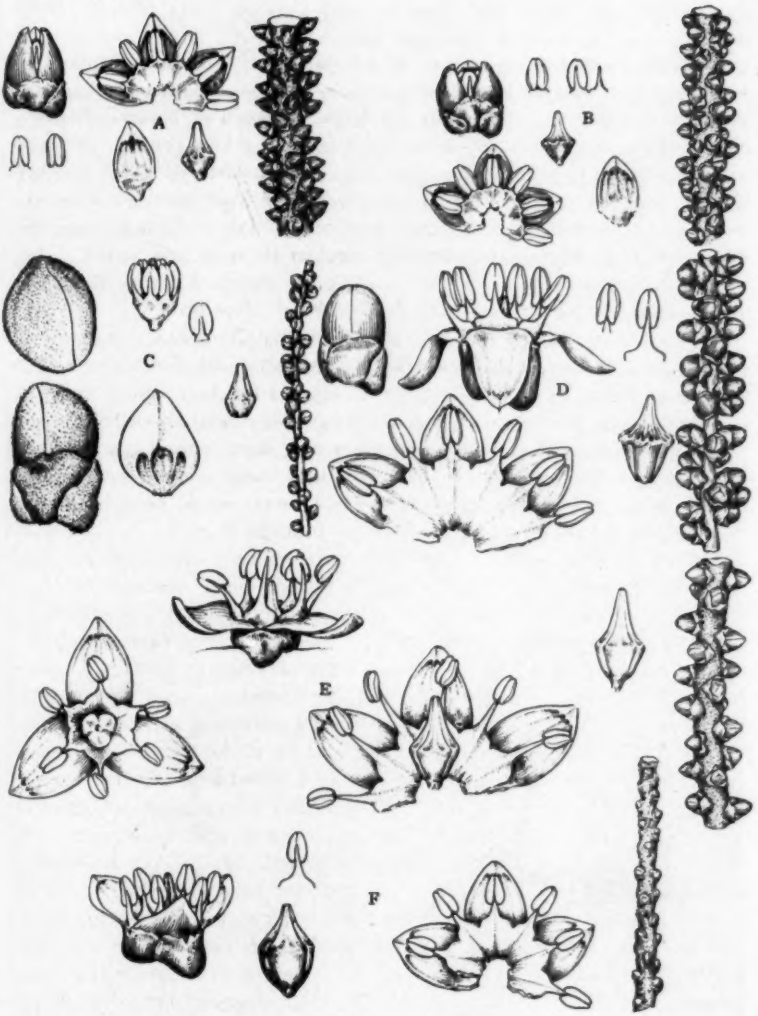
Original specimens of *B. calcarea* are not in existence in Copenhagen, where Liebmann lived and worked, but he left two illustrations that are now available in photographs by the Field Museum of Natural History but which do not greatly aid in the identification of the species. There are two other aids to identification, one being *Brahea nitida* of André in 1887 cultivated in France and supposed to have come from Mexico, the other being two collections by Conzatti in 1937 in the State of Oaxaca, together with somewhat dubious accounts by Beccari in 1907 and 1931.

We make much use in this Fascicle of the J. Francis Macbride photographs of historic specimens for the Field Museum.

In 1940 Dr. O. Hagerup of the University Botanical Museum in Copenhagen, wrote me that there is nothing left of the Liebmann specimens of *calcarea:* "possibly the original material has been lost in the unfortunate fire of the Castle of Christiansborg, 1884, together with the lithographs kept there except for the one copy now kept in the library of our museum. On the other hand, Liebmann may have made his drawings during his Mexican journey, and then there never would have been any original specimens amongst the collections brought home."

Liebmann prepared an Icones Palmarum of sixty drawings, the last ten numbers being cycads. These illustrations were never published, although the pictures are now lithographic prints, the drawings themselves apparently not preserved. A text prepared by him to accompany the plates was left to the disposal of Martius, and its subsequent history appears not to be known. The Field Museum of Natural History in Chicago photographed the prints in Paris where they were sent on loan. Copies of these photographs are in my possession. Two of the pictures represent *Brahea calcarea*, one showing a back view of a folded leaf, the other one a naked panicle of the spadix together with a few unexplained details of a flower. The details represent what appear to have been loose parts and broken pieces, and are of little significance except that the bud is heavily pubescent-tomentose. Apparently fruit had not been collected.

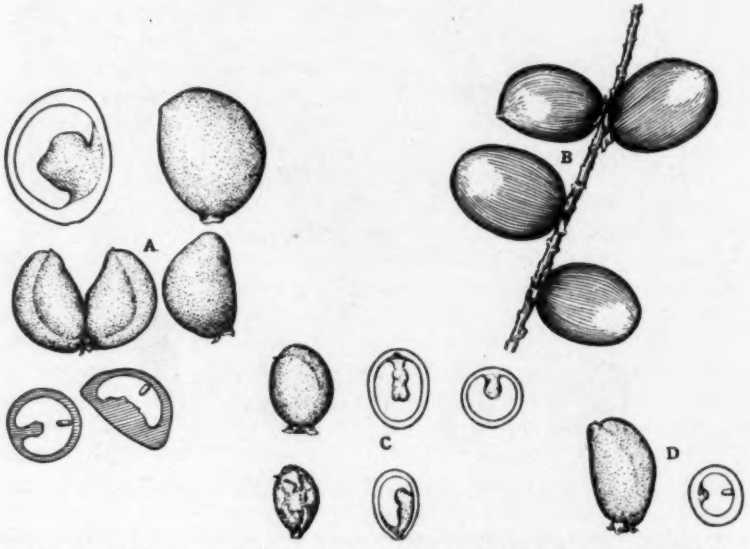
Frederick Michael Liebmann was born in Helsingor (Elsinore), Denmark in 1813. He made his great journey to Mexico in 1840–43, and brought his extensive collections to the Copenhagen museum. He was professor of botany extraordinary in the Copenhagen University 1845–1852, professor and director of the Copenhagen Botanic Garden 1852 until his death in 1856. His name was commemorated by J. Agardh in Liebmannia of the Fucoideæ. See Carl Christensen, Den danske Botaniks Historie, edited by H. Hagerup, 1924–26.



93. FLOWER-BUDS, FLOWER DETAILS, PIECE OF RACHILLA, in six species of Brahea. Rachillæ (at the right in each case) twice natural size. Flowers about five times enlarged, showing bud, flower opened, petal in some cases, stamens, anthers, pistil. A, *Brahea dulcis;* B, *B. Conzattii:* C, *B. calcarea;* D, *B. prominens:* E, *B. Berlandieri:* F, *B. bella.*

The plant *Brahea nitida* is described by Ed André on pages 344–346 in Revue Horticole, Paris, 1887, together with four woodcuts. This is a palm with glaucous leaves and tomentose flowers, with dry fruit about 10 mm. long. Beccari refers the species to *B. calcarea* when he wrote in Webbia, ii, page 99, 1931; also in Annals of the Royal Botanic Garden of Calcutta, xiii, 304, tabula 25, fig. iii, in 1931. He said there was a fragment of a spadix of *B. calcarea* together with immature fruit in the herbarium at Munich collected by Karwinski. Apparently Beccari had not seen the Liebmann lithographs. His figures of *B. calcarea* in the Annals are made "from a specimen cultivated" in the Botanic Garden of Palermo, Sicily, but the floral details do not correspond with the Liebmann details, and I am in doubt. Planted trees I have seen in southern California under the name *Brahea calcarea* are Erytheas.

In 1937 Professor C. Conzatti made collections, numbers 5347, 5371, near Salomé, Distrito de Cuicallán, Oaxaca, altitude 2,000 m., that he considers to represent *B. calcarea*, but the leaves are prominently filiferous and perhaps the rachillæ too short (although not the longest rachillæ may have been taken). Conzatti 5471, planted in Oaxaca, is apparently the same palm. I have inserted details of these Conzatti collections in the pictures herewith, on the probability that they represent the plant intended by



94. FRUITS OF BRAHEA, natural size. A, top to bottom, *B. dulcis;* B, *B. calcarea:* C, five items, *B. bella*, one at base left a dry fruit; D, two items, *B. prominens.*

Liebmann as *B. calcarea.* The fact that these specimens show pubescent-tomentose flower-buds inclines me to relate them to *B. calcarea.* Presence or absence of filaments on leaves is a variable quantity in Brahea, even on different parts of one tree.

95. Spadix panicles of Brahea Berlandieri, showing the short rigid rachillæ. About one-half natural size. Compare with Fig. 91.

96. TREE OF BRAHEA PROMINENS, with hanging fruit-clusters. City of Oaxaca, southern Mexico. Type of the species.

I have not been able to determine the exact location in southern Mexico of the place Xalcomulco where Liebmann got this palm one hundred years ago.

4. **Brahea Berlandieri,** Bartlett, in Publ. no. 461, Carnegie Inst. Wash. 31 (1935). Figs. 92B, 93E, 95.

B. edulis (sphalm.) var. *montereyensis*, Becc. in Webbia, ii, 99 (1907), nomen.

B. dulcis var. *montereyensis*, Becc. in Ann. Roy. Bot. Gard. Calcutta, xiii, 304, t. 25 fig. iv (1931).

Erect tree to 6 or 7 m. tall but beginning to flower when trunk is only 0.75–1 m. high and petioles not yet shed, bole often oblique at base and at length bare up to the crown: leaves prominently even if thinly glaucous and blue-green (at least underneath), not tomentose in folds or about hastula; leaf-blade about 1 m. across either way, central part very closely and compactly plicate, the many segments very narrow and extended into long slender or even hair-like points, 2–2.5 cm. broad near base, closely striate-veined lengthwise and bearing indistinct cross-veins, usually conspicuously filiferous but various in this respect; petiole long and slender, 1–2 cm. broad, base covered in cloth-like brown fabric, margins mostly finely serrate with irregular callous teeth about 1 mm. long but sometimes nearly smooth; hastula short and oblique, margined at apex with jagged brown membrane 1–2 cm. long: spadix dense and narrow, equalling or exceeding the leaves, the peduncle relatively short; individual panicles (issuing from tubular spathe on main rachis) 25–35 cm. long at time of anthesis, stiff, pubescent-tomentose, rachillæ closely placed and rigid, 4–8 cm. long and not sinuous or curved as in *B. dulcis*, flower-buds about 3 mm. high just before expansion, not tomentose; flowers about 6 mm. across when fully open, the anthers then conspicuous and filaments joined at base by broad membranes; pistil angled or sulcate, about 3 mm. high, tapering upward from just below the middle: fruit not known.

Mountains of Nuevo León, Mexico, in vicinity of Monterrey, usually difficult of access.

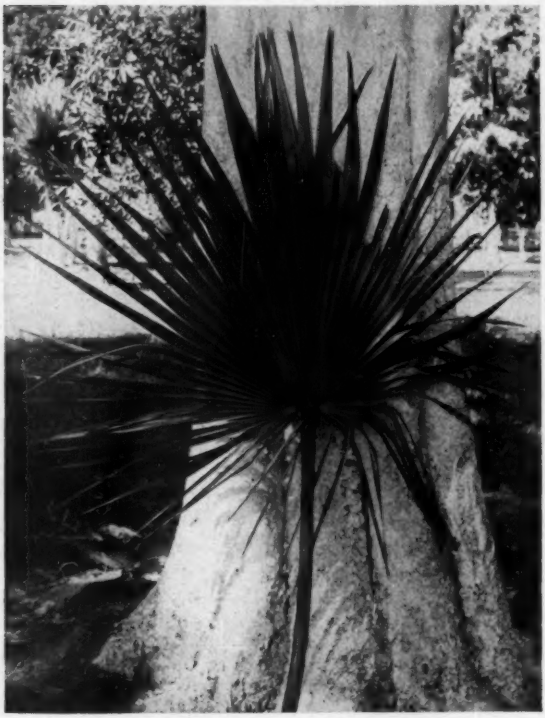
Bartlett founded *Brahea Berlandieri* on *Berlandier 3216* in the National Herbarium, Washington, collected in 1843 on Serro de la Silla, by Monterrey, and he knew no other collection. The specimen is a piece of inflorescence. Number 3216 is also in the herbarium of the New York Botanical Garden. Sargent got it at Mitra Mountain, near Monterrey in 1887, where I have also taken it. The specimens are at the Arnold Arboretum, representing a leaf and flower-clusters with open bloom. This material was seen by Beccari and by him is ticketed *Brahea dulcis* var. *montereyensis*, Becc. In 1887, also, it was obtained by Pringle, number 3030, a spathelet not yet developed and published by me as Fig. 74 in Gentes Herbarum, iv, 124 (1937). I have seen and obtained the species in several trips to the giddy mountains along Cañon de la Huesteca, Santa Catarina, near Monterrey.

The species appears to be variable. In fact, one of my native helpers says there are two kinds of it in the mountains about Santa Catarina, but the differences he points out have seemed to me to be only variants due to location, exposure or other circumstances; yet this is a problem for a local botanist sometime to work out.

Much variation is observed in the armature of the petioles. The margins are typically callous-dentate, I think, although smooth examples are common. I have chosen what I consider to be a fair sample for Fig. 92. Sometimes a petiole is nearly or quite unarmed near its top but strongly toothed toward its base. One must be prepared for smoother edges when the petioles have been carried long distances in the hands of native collectors.

† 5. **Brahea prominens,** spec. nov. Figs. 92C, 93D, 94D, 96, 97, 98.

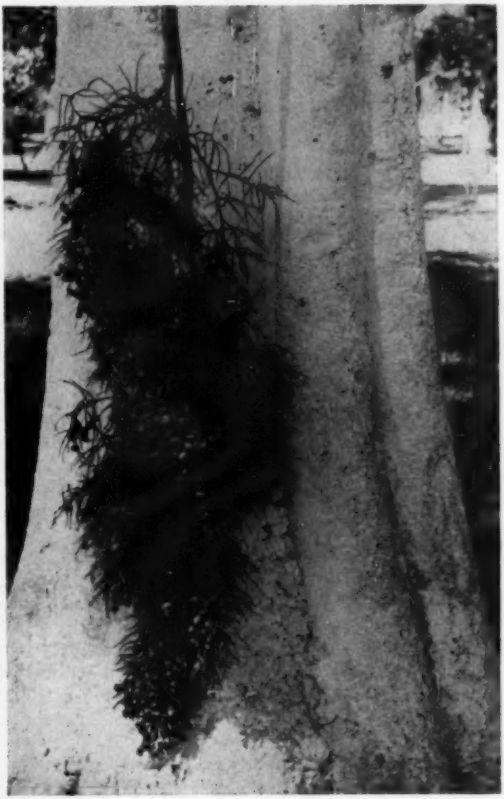
Valida erecta palma; truncus 8–10 m. alta, 30 cm. diam. basi, compacte annularis: folia 1 m. vel plus lata et longa, glaucissima subter, lætevirentia supra, glabra; segmenta 50–70 vel plura, valde angusta vel attenuato acuta, 1–2 cm. lata basi; filamenta pauca et brevia, venæ parallelæ multæ, nullæ venæ transversæ; petiolus ad 180 cm. longus, non dentatus; hastula conica et brevis: spadix in longissimo pedunculo, excedens folia et pendens cum fructifera et 3–4 m. longa; rachillæ 5–8 cm. longæ, rectæ vel pæne rectæ, pæne vel admodum glabræ, flores non depressi; floris gemmæ 2–3 mm. longæ, glabræ, acutæ: fructus lutescens,



97. Leaf of Brahea prominens. Oaxaca.

16–17 mm. longus, 10 mm. crassus, vel 13–14 mm. longus cum siccus,rectus in latere ventrali, convexus in latere dorsali, apex obliquus; embryon dorsale et medio.

Stout erect tree; trunk 8–10 m. tall, 30 cm. thick at base, not quite straight, not oblique at bottom, abundantly ringed from the falling of petioles: leaves orbicular in ambitus, 1 m. and more across, prominently silvery underneath with a flaky glaucous covering, light green above, glabrous throughout, blade divided to the middle or below into 50 and more narrow-long-pointed segments that are 1–2 cm. in width below the split, points very slender, deeply plicate or folded, with many closely placed parallel veins and practically no cross-veins, filaments few and very short, midrib on rachis continued about 15 cm. on under side of leaf; petiole very long (180 cm.), plano-convex in outline, glaucous, not toothed on margin, hastula somewhat conic and lacking any marked membranous margin: spadix very long and in fruit exceeding the leaves and hanging beneath the coma or crown, the nearly cylindric sheathed peduncle longer than the fruiting part (in one measurement peduncle from base to fruiting part 74 inches long, fruiting part itself 48 inches long, a total of 122 inches), much branched, rachillæ or ultimate branchlets 5–8 cm. long and straight or only indifferently curved and glabrous or only very lightly pubescent but not tomentose, flowers closely placed and not sunken; flower-buds 2–3 mm. long at period of anthesis, glabrous, the cupulate calyx occupying one-third to one-half the length, connivent and slightly striate imbricate corolla-lobes forming a pyramidal apex: fruit beetle-shaped, straight or flattened on ventral



98. Fruit-cluster of Brahea prominens. Oaxaca.

side, 16–17 mm. long and 10 mm. thick when fresh, drying to 13 or 14 mm. long and about 9 mm. thick, light dull yellow or greenish-yellow, the outside pulp scant, apex with a very short oblique point, cupule very small with sharp petal-lobes, embryo about midway up the back and opposite the small podium and micropyle.

One conspicuous tree planted on Pasco Juárez, lado oriente, city of Oaxaca, Mexico, *Bailey 533* (type), origin of tree unknown. Limestone cliffs above Trece Aguas, Alta Verapaz, Guatemala, altitude 3,000 feet, *Cook & Doyle no. 3* in National Herbarium, Washington, collected 1914. The Oaxaca tree was brought to my attention in 1938 by photographs and specimens sent by Professor Conzatti. I found the tree in full fruit in March, 1940, and the photographs herewith (Figs. 96–98) were made by me then. It is a prominent palm in the park.

† 6. **Brahea bella,** spec. nov. Figs. 92D, 93F, 94C, 99, 100.

Parva erecta palma, 4–10 m. alta; truncus rectus, 20–25 cm. crassus basi, annulatus: folia lucido-virens supra et subter, non glauca; lamina 150 cm. longa et lata, profunde divisa in longa et angustissima segmenta 2 cm. lata basi; filamenta brevissima, inconspicua; petiolus moderate longus, non dentatus, vel tantum aliquid irregularis in marginibus; hastula brevi-conica, lato margine: spadix brevior quam folia, rachillæ graciles, 2–8 cm. longæ, 1–2 mm. crassæ, albo-tomentoso-pubescentes, compacte floriferæ; floris gemmæ glabræ, 1–2 mm. longæ, obtusæ; flores 3–3.5 mm. alti anthesi, petala brevi-acuta: fructus albo-tomentosus cum juvenis sed serius pæne vel admodum glaber, cum maturus lato-oblongus, 12–13 mm. longus, 10–11 mm. latus, satis viridis vel rufescens, minor cum siccus, valde curvatus in dorso, brevi-acutus apex obliquus.

Erect tree 4–10 m. tall; bole straight and post-like, not oblique at base, 20–25 cm. thick near ground, nearly bare and no shag below the coma or crown, rather closely and not deeply ringed, with a few fragments of petiole fibers persisting now and then: leaves very bright green on both sides, not glaucous or bluish, glabrous, more or less glossy and shining in the sun, limp and at length hanging and with no attitude of stiffness or rigidity, tending to break over at the margin of the palman and giving them something of the look of a Washingtonia; leaf-blade 1.5 m. more or less long and broad, deeply divided into 50 and more segments 2 cm. broad toward base and split into two parts that extend to long and very narrow slender ends, strongly parallel-veined and somewhat cross-hatched, filaments very short and not conspicuous; petiole plano-convex, striate lengthwise, margins mostly unarmed or only roughish except toward base where short teeth may be present, hastula short-conic and usually bordered with a broken membrane: spadix shorter than leaves, the many ultimate branchlets or rachillæ 2–8 cm. and only 1–2 mm. thick, white-tomentose-pubescent, closely flowered; flower-buds glabrous, somewhat immersed below the tomentum, 1–2 mm. high, obtuse, the petals imbricate; flowers very small, about 3–3.5 mm. high at expansion, the short-acute petals somewhat exceeding the 6 stamens, filaments much expanded at base and forming a cup: fruit at first white-tomentose but becoming nearly or quite

glabrous, at maturity broad-oblong, 12–13 mm. long, 10–11 mm. broad, strongly curved on the back and short apical point oblique, flattish and nearly straight on ventral side, dull green to reddish, cupule very small with pointed petals; intrusion a narrow filled central channel extending nearly the length of the albumen, the podium also narrow and expanding lengthwise at the surface of the seed.

Northern Coahuila, Mexico: Municipio de Múzquiz, on plains and mountains at altitude of 2,000–3,000 feet, in clefts and seams of limerock and among separated boulders of it, growing as single trees in many sizes but often covering the valley floor as if in forests and abundant on cliffs and broken ranges at higher altitudes. Seen by me first on Rancho San Geronimo (Mangum) about fifty miles northwest from postoffice at Múzquiz near upper waters of Rio La Babia, *Bailey 717* (type) and *718*, again farther on at Rancho Agua Dulce (Persons), *Bailey 719*. Pieces of inflorescence collected at Mazatlan in Sinaloa, Mexico, *Jesús G. Ortega 4078*, *5630* apparently represent this species. Purpus 5559a from San Luis Potosi may be this species, although the strongly angled immature fruits are peculiar.

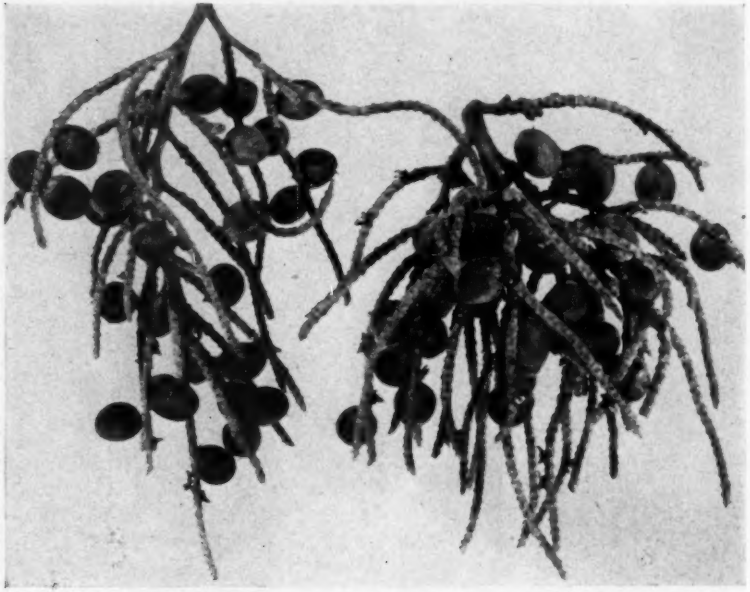
99. Trees of Brahea bella. State of Coahuila, northern Mexico.

Note on an Erythea

Sereno Watson's genus Erythea was separated from Brahea: cf. Gent. Herb. iv, fasc. iii. The two genera are very close together, yet I think they are distinct and they appear to have different horticultural possibilities. The published marks of separation are not satisfactory, and I now state the main contrasts as I see them:

Erythea, 1880, differs from Brahea, 1838, in the less closely parallel-plicate folds on palman of the leaf, less tomentose rachillæ, flowers larger and not sunken in the axis or imbedded in tomentum, carpels not united at base, fruits larger rounder and plum-like, single rather than sometimes twin, lacking the very short sharp oblique beak-like point of Brahea, podium extending inward in a rounded knob nearly or quite to the center of the albumen rather than lying also longitudinally along one side, sarcocarp much more pronounced, embryo near base rather than usually dorsal.

In my Erythea paper in 1937 I adopted "with hesitation" the binomial *E. Roezlii*, Becc. for a palm I had collected in canyons in Sonora, the name having been taken over from *Brahea Roezlii*, Linden. I am now convinced that the Roezl palm was one of the several forms of *Erythea armata*, and I bestow "a new name as I had at first intended." In making this change I



100. FRUITS OF BRAHEA BELLA, about one-half natural size. Coahuila.

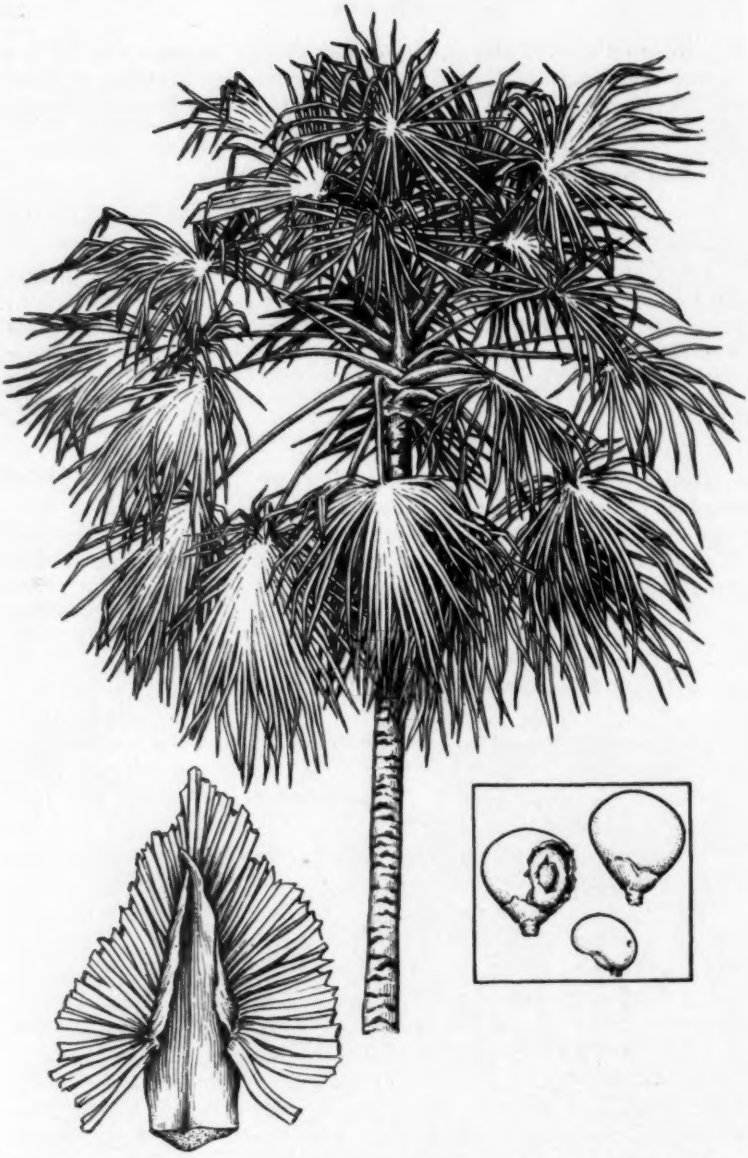
am supported by evidences of my own and also by the opinion of the late J. Harrison Wright of Riverside, California, whose knowledge of palms was critical and exact, and who had maintained correspondence (in French) with Beccari.

† **Erythea clara,** spec. nov.

E. Roezlii, Bailey, Gent. Herb. iv, 114, figs. 69, 70, 71 (1937), not Becc.

Palma glauco-cærulea speciosa, coma condensa; truncus valde annulatus; foliorum segmenta 80–100 vel plura, perlonga, plana, 1–3 cm. lata; lamina vix cerifera; petioli 3–4 cm. lati, glabri, marginalibus dentibus 8–20 mm. longis, separatis: spadix ascendens, denique arcuata, 2–3 vel 4 cm. longa; thyrsi breves, 40–50 cm. vel minus longi; rachillæ validæ, 4–8 cm. longæ, divaricatæ; laminæ spathellarum 4–6 cm. longæ; flores parvi aggregatique, bractæ minutæ non aculeatæ: fructus compressus, circularis, 18–20 mm. diam. in latitudinem et in longitudinem.

This slender palm from the hidden Nacapule Canyon on the western side of the State of Sonora, many kilometers away from Guaymas, and from other areas in that region (perhaps native in Baja California), is sufficiently illustrated and also accounted for in my Erythea fascicle, and further comment is unnecessary. I have not seen it in cultivation.



101. TREE, HASTULA, FRUITS AND A SEED ABOUT NATURAL SIZE, of *Sabal Allenii*. Perlas Islands, Gulf of Panama.

ARTICLE 5.

NEW PALMS IN PANAMA, AND OTHERS.

Assignment to me of the palm botany for Woodson & Schery, Flora of Panama, has placed in my hands all the herbarium collections from that country in the Missouri Botanical Garden, and I have examined the material in the National Herbarium in Washington and the Field Museum of Natural History in Chicago, and elsewhere, and important and excellent collections have come to me from Paul H. Allen of the Canal Zone. All these collections have required sustained study for several months. It is the largest assemblage of Panama palm material yet available for botanical study. The novelties are here given diagnosis.

At first sight it may seem strange that so many new things have appeared in collections from Panama, but they were to have been expected and perhaps I am surprised at the small number of them. North Americans are likely to think of Panama as the Canal Zone, but a map of the Republic shows that the Zone is only a band across the very narrow part of the country where the mountains are low. With the exception of O. F. Cook's work on Phytelephas, which he assigns to Phytelephantaceæ, beginning in 1912, I do not recall any new species of palm having been described from the territory of the present Republic of Panama until the publication of my paper in Gentes Herbarum in 1933, where seven species were established and one was newly transferred to another genus. It was not until later in that year that Burret founded his *Euterpe panamensis*, and there the record ends for species native to the country until I described *Acrocomia panamensis* in 1941.

My impression from my own collections and studies covered in the first Gentes paper led me to say that "apparently the palm flora of Panama is not extensive." I should now greatly expand that statement. Even with the 70 or so species in 26 native genera I now include in the Panama inventory, I conclude that the country is yet only fragmentarily covered for palms. We are beginning to understand that for the most part the species of palms do not naturally inhabit great expanse of territory, and many of them are strictly local. The difficulties attending the study of Panama palms are apparent when one recalls that the country lies between Central America and South America each with its separate literature, and that specimens in the herbaria are few and the older ones of them are

commonly inadequate. Moreover, under present conditions we are unable to consult collections abroad.

The pen work in this Fascicle is by Florence Mekeel.

† **Sabal Allenii,** spec. nov. Palma de guagara. Fig. 101.

Palma alta, ad 20 m.; truncus nudus, annulatus, 30 cm. diam. basi; coma 15 m. super terram in arboribus maturis: folia 2 m. plus vel minus lata, lucida supra, subter cinerea, glabra; palman 30–45 cm. longa; segmenta 40 vel plura, 8–12 cm. lata, 1.5 m. longa, angustissima vel filiformia apice, divisa in subsegmenta 2–4 cm. lata; costæ valde prominentes, secundariæ costæ elevatæ vel depressæ: spadices valde diffusæ, erectæ, tam longæ quam folia, rachillæ glabræ et striatæ: fructus lucidus, 8–10 mm. in laterali diam., globularis vel oblatus vel pyriformis; semen in mesocarpio, 5–7 mm. diam., lucidum, depressum; micropyla lateralis.

Tall palm, to 20 m., with slender erect trunk soon becoming bare and showing distinct rings, about 30 cm. diameter at base; crown about 15 m. above the ground on mature trees, consisting of 20–30 live leaves and usually 5–7 dead leaves hanging underneath (and piles of accumulated fallen leaves about the trunk): leaves to 2 m. across, thin in texture, glossy green on upper surface and much lighter colored though not glaucous underneath, very deeply divided into 40 and more narrow ridged segments, without filaments, palman 30–45 cm. long beyond top of petiole; hastula 8–9 cm. in length, narrowly long-pointed, margins rolled in or incurved; segments 6–12 cm. across, 1.5 m. long and produced into very long and narrow or even almost thread-like extremities, soon divided into subsegments 2–4 cm. broad at base, the 1, 2 or 3 midribs strongly upstanding 2–3 mm. high, with secondary intervening ribs and furrows and then fine lengthwise parallel lines, much faint curved cross lines that are more prominent underneath, surfaces glabrous; petioles about as long as leaf-blades, sharp-edged, split at base but not persisting: spadices erect, very open and diffuse, about equalling the leaves in length, the branches glabrous and striate, ultimate rachillæ very slender and 6–10 cm. long, apices of nodibracts very acute or produced, sheaths striate: fruit glossy brownish-black, 8–10 mm. across at middle, sometimes twin, nearly globular to oblate and short-tapering to base so that most of the samples are somewhat pyriform, basal part scarified; seed contained in a fibrous mesocarp, dark brown, oblate, 5–7 mm. thick crosswise, glossy, depressed, faintly ribbed top to bottom, micropyle lateral.

Perlas Islands, Province Panama, said to be confined to Pedro Gonzales on which it was taken twice in 1941 by *Paul H. Allen, 2604.* Leaves are commonly used for thatch throughout the Islands. It is the only Sabal known in Panama.

Contrast in color between the two surfaces of the leaves is a marked feature of this species, as also the absence of filaments on leaves, bare and ringed slender trunk, short palman, prominently ridged leaves, slender rachillæ, small glossy more or less pyriform fruits, developed mesocarp holding the very small seed. Some of these features (particularly the fruits

and seeds and presence of mesocarp) well distinguish it from *S. mauritiæformis* of the Caribbean region and Cauca valley east of the Cordillera Occidental in Colombia.

† **Euterpe roseospadix,** spec. nov. § Euterpotypus. Fig. 102.

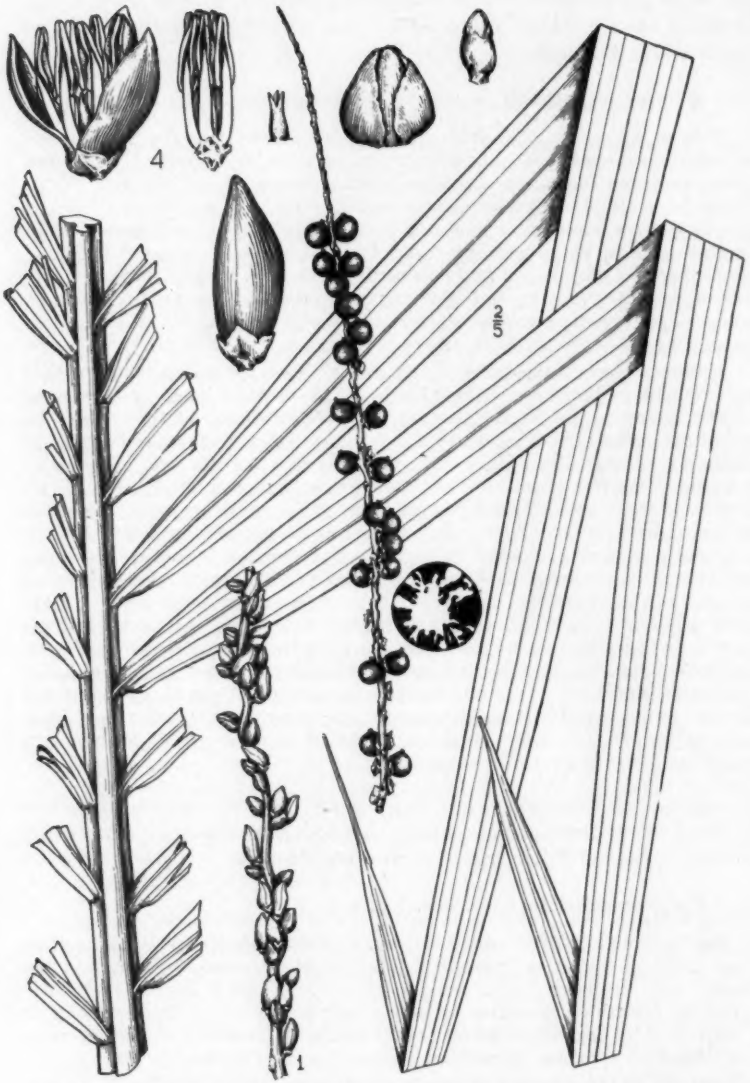
Erecta, ad 2 m. alta: folia pinnata, glabra vel minute puberulenta subter; lamina 1.5 m. vel plus longa, 1 m. lata medio; petiolus 1 m. longus, concavus supra, carinatus in dorso; pinnæ oppositæ vel alternæ, 25 vel plures in utroque rachidis latere, longo-lineares, 50 cm. longæ, 4–5 cm. latæ, longo-acuminatæ, scindentes basi, costa media prominens, venæ laterales paucæ et subsidiariæ: rachillæ nitido-roseæ 30–40 cm. longæ, ramis; gemmæ staminatæ anthesis acutæ, 5–6 mm. longæ; gemmæ pistillatæ non acutæ, 2–3 mm. longæ: fructus globulari-obliquus, 9–10 mm. crassus cum siccus, punctus stigmaticus distinctus, cupula applanata et conspicua; semen tessellatum, albumen album, non cavitosum, ruminatum.

Erect, to 2 m.: leaves pinnate, glabrous unless for minute puberulence under a lens on bottom side; leaf-blade 1.5 m. or more long, 1 m. broad at middle, pinnæ opposite and alternate at different parts of the rachis, the rachis triangular in section and ridged; pinnæ 25 or more on either side of rachis, long-linear, the main ones 50 cm. long and 4–5 cm. broad at middle, tapering to narrow points but not caudate, splitting at the base as if two or three of them were attached together, midrib prominent and on the under surface more or less lepidote, side veins less pronounced and few; petiole 1 m. long, somewhat flecked or lepidote but perhaps becoming glabrous, concave on upper face, ridged on lower face: spadix bright pink, glabrous or becoming so; rachillæ 30–40 cm. long, very slender and only 1–2 mm. thick when dry, branched, angled in drying, rather closely flowered; staminate buds at anthesis 5–6 mm. long, 2–3 mm. thick, prominently pointed; pistillate buds 2–3 mm. long, not pointed: fruit nearly globular but oblique, 9–10 mm. thick either way when dry, stigmatic point pronounced but not central, cupule applanate and conspicuous; seed with tessellate exterior, solid and white in center, ruminate one-half or more the diameter with coarse projections from the walls.

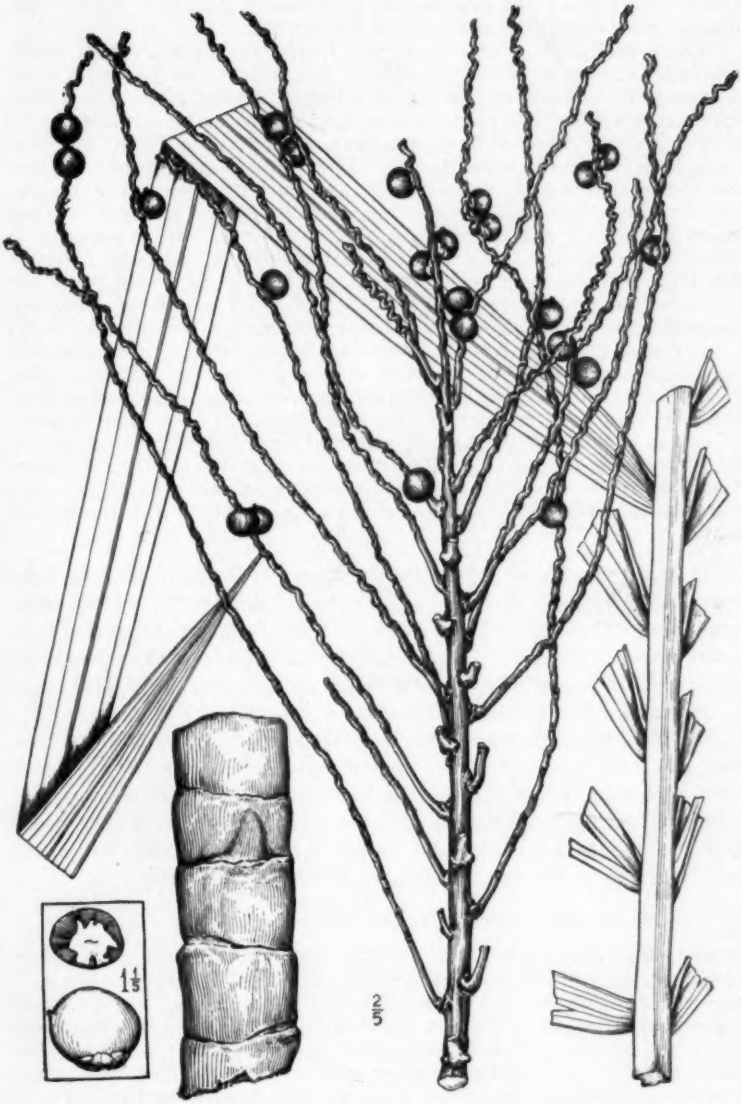
Chiriqui, Panama: vicinity of Bajo Chorro, altitude 1,900 m.; *Woodson & Schery 623:* known as "Manaca." This and *E. panamensis*, Burret, are the only species of Euterpe yet known from Panama.

† **Prestoea sejuncta,** spec. nov. Fig. 103.

Parva arbor; truncus erectus, 5 cm. crassus. annuli prominentes, circa 3 cm. inter se distantes; coma 6–8 foliorum maturorum; culmen superius absens: folia pinnata, glabra, lamina pæne 2 m. longa et ferens 70–80 subopositas pinnas et rachidem triangularem; pinnæ 60–65 cm. longæ, 3.5–5 cm. latæ, longo-acuminatæ, costa media prominens, venæ laterales subordinatæ: spadices infrafoliares; spathæ 2, exterior 20 cm. longa, interior vel major 75–80 cm. longa, furfuracea; rachillæ circa 25, ascendentes, bulbosæ basi 30–70 cm. longæ: fructus ater, depresso-globosus, 10 mm. altus, 11–12 mm. crassus, anceps, stigma in parte laterali; cupula



102. PART OF LEAF AND DETAILS of *Euterpe roseospadix*. Cross-section of ruminated fruit natural size.



103. PART OF LEAF AND OF SPADIX of *Prestoea sejuncta*. Piece of trunk and two fruits at lower left.

plana, plus quam 6 partium; semen irregulariter planatum, circa 8 mm. diam., tessellatum; albumen omnino ruminatum.

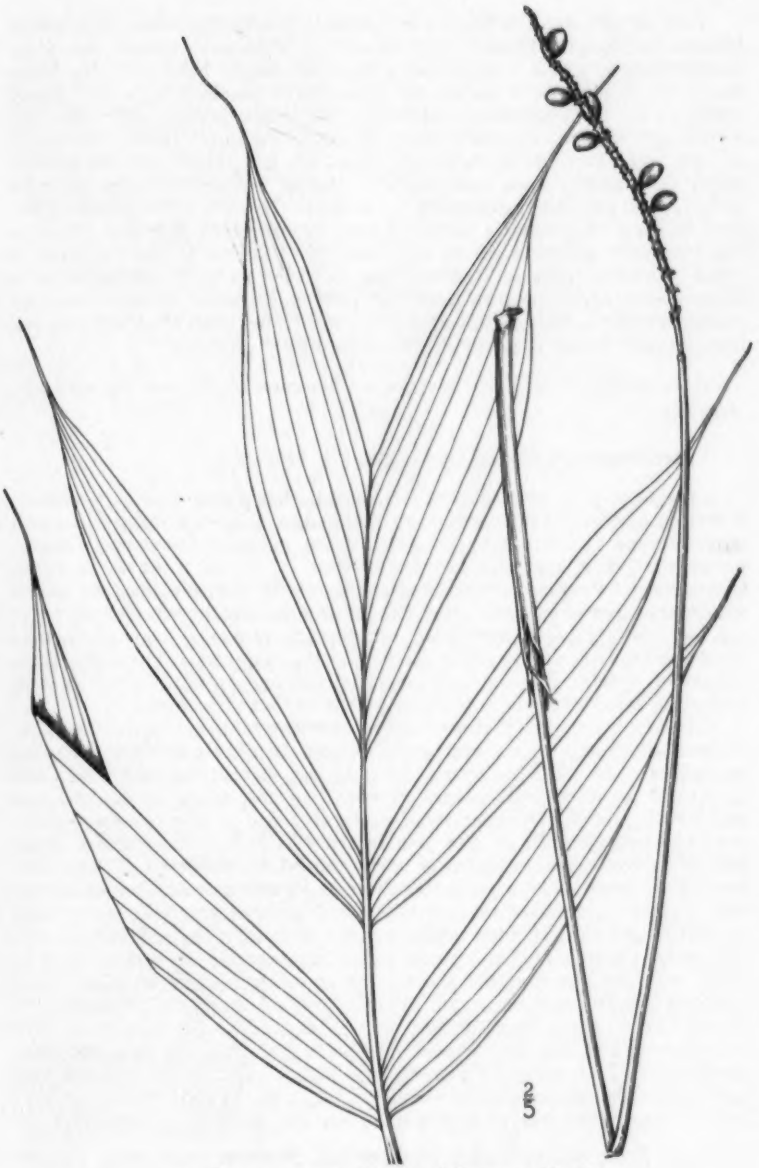
Erect small tree, 5 m. or more tall; trunk about 5 cm. diam., woody and hard, with pronounced rings about 3 cm. apart, bearing a crown of 4–8 mature pinnate leaves and devoid of a regular crownshaft; blade of main leaves nearly 2 m. long, with 70–80 subopposite pinnæ on a triangular red rachis; pinnæ at mid-leaf 60–65 cm. long, 3.5–4 or 5 cm. broad, glabrous, margins more or less thickened or ribbed, midrib prominent, side ribs markedly subordinate, long-acuminate, the lower ones essentially caudate; petiole with a split and clasping base 6–7 cm. across, nearly 1 m. long, concavo-convex in section: spadices infrafoliar, erect, close to the coma or crown of leaves, about 4 in number; spathe-valves 2, the outer about 20 cm. long, inner or main one 75–80 cm. long, 2–2.5 cm. broad before dehiscence, bearing reddish-brown furfur; peduncle of spadix red, terete but perhaps angled in drying, 25–30 cm. long, passing into a continuing rachis 30 and more cm. long; rachillæ about 25, pinkish, strongly ascending, 30–70 cm. long, glabrous, much swollen at base just as they join the rachis; flowers in shallow depressions on the rachillæ: fruit depressed-globose, black, 10 mm. high and 11–12 mm. thick, lop-sided and stigmatic point off-center, cupule of more than six parts and applied tightly to the surface; seed irregularly depressed-globular, loose inside a thin inner mesh, about 8 mm. across the long way, surface tessellate, basal scar very broad; albumen ruminate, being filled with brown partitions that extend to the cavitous center.

Panama: vicinity of Police Station, upper Rio Pequini, Madden Lake area, Canal Zone, *A. G. B. Fairchild & Daniel Jobbins 2635* (type), communicated with notes by P. H. Allen; El Valle de Anton, Province Coclé, about 1,000 m., vicinity of La Mesa, *Allen 2740*. This makes five recognized species of the neglected genus Prestoea, which lacks the crownshaft of Euterpe and differs in floral and fruiting characters.

In the National Herbarium in Washington is a good specimen of Prestoea, sheet No. 618356, ticketed from Martinique, 23 Père Duss. Another sheet with only a leaf tip and indeterminable, is ticketed Guadeloupe. I do not describe the Prestoea attributed to Martinique. I have pieces from the wild in Guadaloupe, not sufficient for identification. I have not seen Prestoeas in my own collecting on the French islands.

† **Geonoma Allenii**, spec. nov. Fig. 104.

Gracillima parva palma 2 m. alta: folia pinnata, cinereo-viridis; lamina 25–35 cm. longa; petiolus gracillimus, 30–40 cm. longus; pinnarum 2 jugæ et terminalis profunde lobus bifidus, 20–25 cm. longus, 3–4 cm. latus, angustatus ad apicem, interdum caudatus, plus vel minus falcatus, costæ multæ 4–5 mm. inter se distantes, glabræ supra et subter: spadix simplex, glabra spica 10–14 cm. longa, bractea subtenta, pedunculus 50 cm. longus et erectus, vaginatus basi; spica 2–3 mm. crassus cum fructifera, alveoli separati in 4 lineis, labia inferior divaricata: fructus oblongo-pyriformis, 10–11 mm. longus, pæne obtusus, glaber, papillatus.



104. LEAF AND SIMPLE SPADIX OF *Geonoma Allenii*.

Very slender small palm to 2 m. tall with practically evenly gray-green pinnate leaves with blade 25–35 cm. long and concavo-convex petiole of similar length: pinnæ 2 pairs and a terminal deeply bifid part, the bases broad at attachment to rachis and not always precisely opposite, length about 20–25 cm., breadth at middle 3–4 cm., long-tapering rather abruptly into a narrow end and usually (as on apical lobes) into a thread-like cauda 5–7 cm. long, veins pronounced and about 4–5 mm. apart and elevated on upper face, glabrous on both surfaces: spadix a simple slender glabrous spike 10–14 cm. long subtended by a sessile bract (upper spathe-valve) that leaves a ring when it falls, the very slender erect peduncle about 50 cm. long with glabrous striate sheathing spathe-valve at base; rachilla or spike 2–3 mm. thick at fruiting time, alveoles distinct and separate in about four rows, the narrow nearly or quite entire lower lip divaricate and prominent: fruit oblong-pyriform, 10–11 mm. long, somewhat narrowed to base, nearly obtuse at apex, glabrous, somewhat pimpled.

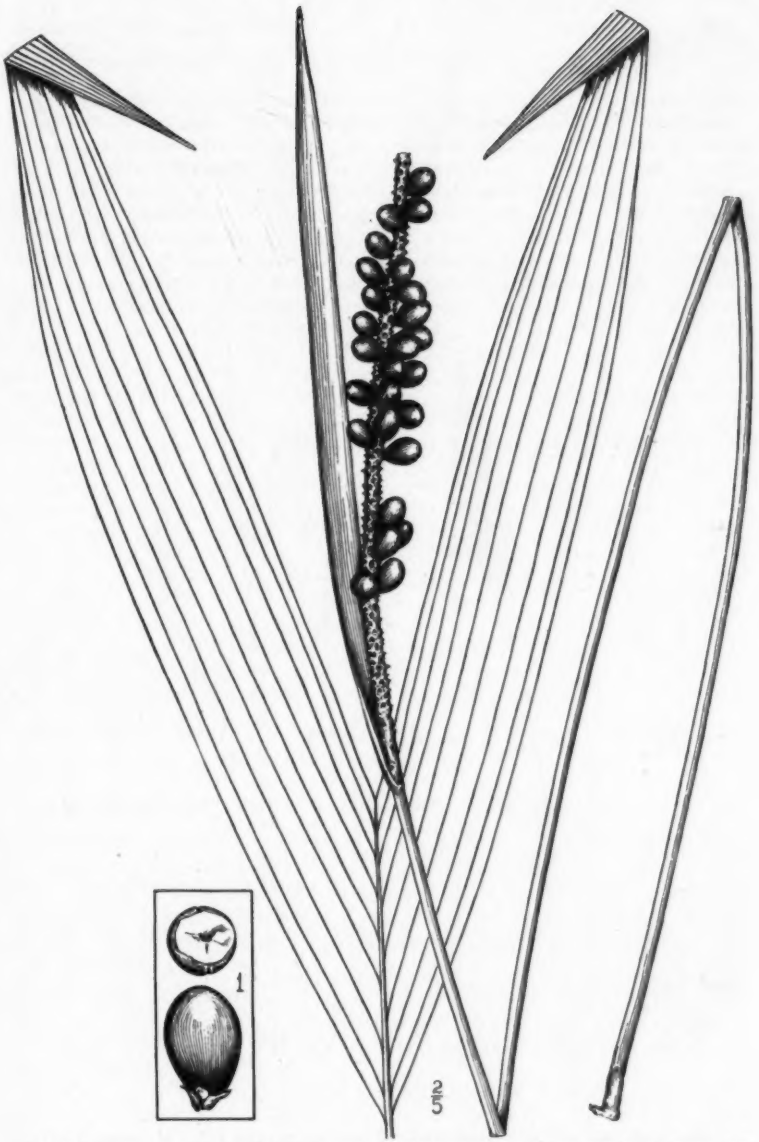
Hills north of El Valle de Anton, Province Coclé, 800 m. altitude, *Allen 2947*.

† **Geonoma costatifrons,** spec. nov. Fig. 105.

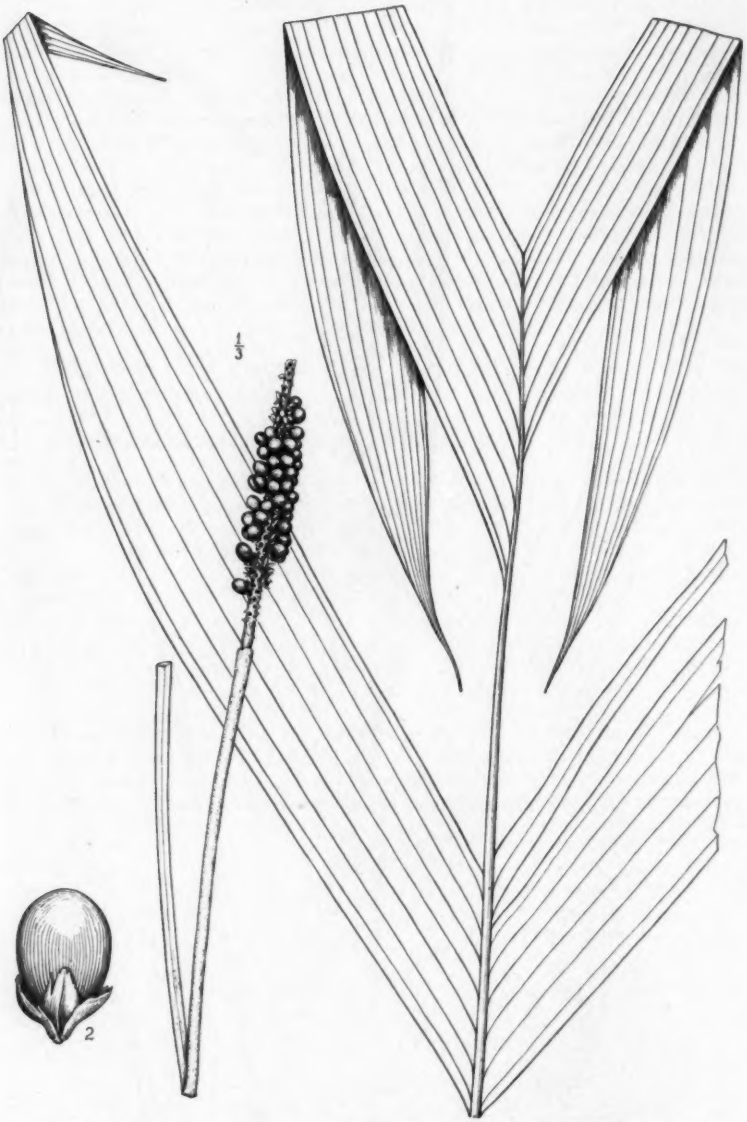
Gracilis, 3–4 m. alta, glabra: folia inæqualiter pinnata, juga terminalis interdum angustissima interdum latissima, aliæ 40–50 cm. longæ, 3–8 cm. latæ; petiolus 75 cm. longus, 5–10 mm. latus, planus subter, acutus supra; pinnæ alternæ et oppositæ, nonnullæ affixæ 10–12 cm. inter se distantes, angustatæ ad longum rectumque punctum, latæ basi, pluribus vel multis validissimis costis et sæpe inter has scindentes: spadix simplex spica 30 cm. vel plus longa, in gracillimo et erecto pedunculo longa et angusta spatha subtenta; axis spadicis glaber, alveoli separati et distincti, labia reflexa et striata: fructus (non maturus) oblongo-pyriformis, 15–16 mm. longus, 10 mm. latus, apex obtusus, glaber, scaber cum siccus.

Slender, 3–4 m. tall, glabrous unless scurfy on petioles: leaves unequally pinnate; blade about 1 m. long; petiole 75 cm. to 1 m. long, firmly clasping for perhaps one-third its length, very slender, flattish on under side and 5–10 mm. across, sharply ridged on upper surface; pinnæ 40–50 cm. long and 3–8 cm. broad with narrower ones intervening or near the apex, alternate and opposite, about 2 or 3 main pairs aside from a terminal broad pair and sometimes terminal very narrow shred-like units, all of them with broad base from which extend several or many costæ or ribs prominent on both surfaces and yellowish underneath and between which the pinna tends to split lengthwise, all very gradually and straightly tapered to long narrow point, placement of the pinnæ often far apart on the rachis, often as much as 12 cm., so that the leaf may have an open or skeletonized look: spadix a simple spike to 30 cm. or more long on an angled glabrous peduncle two to three times as long and subtended at the base by a very long narrow leaf-like spathe; axis of spadix glabrous, the pits distinctly separated and its lower lip retrorse and striate after anthesis: fruit (yet immature although apparently about full size) oblong-pyriform, 15–17 mm. long, 10 mm. broad toward apex which is obtuse, glabrous, drying roughish.

Canal Zone region. Upper Rio Pequini, Madden Lake area, vicinity



105. APEX OF LEAF AND SIMPLE SPADIX of *Geonoma costatifrons*. Fruit at lower left.



106. LEAF AND SIMPLE SPADIX of *Geonoma condensata*. Fruit at lower left.

of Police Station, *A. G. B. Fairchild and Daniel Jobbins 2639* (type); Quebrada Lopez, *Allen 2134*.

† **Geonoma condensata,** spec. nov. Fig. 106.

Parva arbor vel frutex, 1.6 m. alta: lamina circa 1 m. longa, satis viridis, glabra, valde costata, irregulariter pinnata, includens profunde bilobatam partem terminalem et unam jugam 10–12 cm. remotam; pinnæ vel lobi 40–50 cm. longi, 6–7 cm. lati, bases latissimæ; costæ 10–12 mm. inter se distantes, 2 vel 3 tenuiores inter eas, albescentes in parte inferiore pinnæ: spadix solitaria et simplex, 12–16 cm. longa, 4 mm. crassa anthesi, condensa, glabra, granularis; pedunculus 1 m. longus, compressus; alveoli compacti, labiæ non divaricatæ: fructus oblongus, 11–12 mm. longus, obtusus apice, glaber, 6 amplificatis, angustis, pæne separatis partibus floralibus affixis cum caducus.

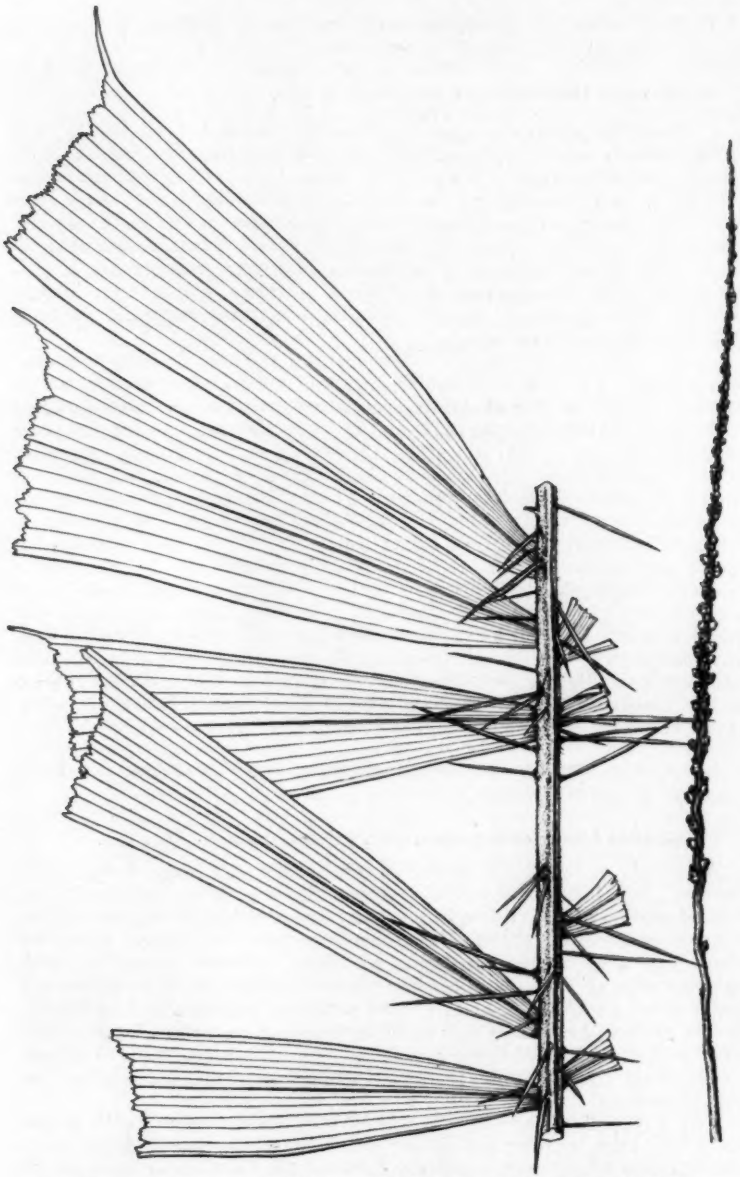
Tree or bush 1.6 m. tall: leaf-blade about 1 m. long, dull green, irregularly pinnate, glabrous both surfaces, lighter colored underneath; pinnæ about 2 pairs including the bilobed apical part, and a few intermediaries or shreds (as splits of pinnæ) between the separation between the two pairs being perhaps 10–12 cm. of rachis, the wide bases irregularly opposite; terminal part divided into long-acuminate lobes 40–50 cm. long and 4–6 cm. broad; each of the other pair 40–50 cm. long and 6–7 cm. long; all pinnæ and lobes very strongly many-ribbed, the main ribs whitish on under surface and 10–12 mm. apart with 2 or 3 thinner nerves between; petiole and rachis slender, glabrous, sharply ridged on upper surface: spadix a single simple condensed spike 12–16 cm. long, borne on a flattened two-edged petiole-like peduncle 1 m. long; rachilla glabrous but granular, about 4 mm. thick; alveoles close together, broad and rather high before frutescence, the lips not prominently projecting: fruit oblong, 11–12 mm. long, only slightly contracted to base, obtuse at apex, glabrous, carrying the 6 enlarged nearly separate narrow floral envelopes with it when removed and leaving a chaffy cup of 3 projecting bracts.

Isla Colon, vicinity of Chiriqui Lagoon, Province Bocas del Toro, Panama, *H. von Wedel 2972*.

† **Aiphanes fuscopubens,** spec. nov. §Brachyanthera. Fig. 107.

Arbor ad 5 m. alta, truncus tectus spinis: folia 2 m. longa, irregulariter pinnata, aliquid lucida, glabra et espinosa supra et infra; petiolus brevis, multis fuscis plano-convexis spinis 4–8 cm. longis et hirsuto-pubescentibus; pinnæ 20 vel plures in utroque latere rachidis, 15–30 cm. longæ, 10 cm. vel minus latæ apice, nonnullæ divisæ ad basim, erosæ et truncatæ apice, multi-nervatæ et sine costis mediis; rachis spinifera et fusco-pubescens: spadix erecta; cymba angusta, aliquid aculeata; pedunculus longissimus, gracilis, aculeatus et pubescens; rachillæ simplices, 30–40 cm. longæ; flores multi, contigui, pistillati flores 4 mm. lati et 5 mm. longi, flores staminati 3 mm. diam.; petala valvata, axis rachillæ angulata, fusco-pilosa vel fusco-pubescens.

Tree 5 m. tall, apparently not soboliferous, trunk covered with spines: leaves 2 m. long, more or less glossy; petiole short, bearing blackish plano-convex spines of different lengths some of which are 8 cm. long, and also



107. PART OF LEAF WITH THE PRICKLY RACHIS AND SIMPLE SPADIX of *Aiphanes fuscopubens*. ×½.

shreds at the somewhat expanded base, the surface as well as that of the rachis showing much black hairy pubescence 1–3 mm. long; pinnæ 20 or more either side the ridged rachis, 15–30 cm. long, 10 cm. broad at apex or some of them split into 2 or 3 narrower units, apex irregularly truncate and shallowly erose and toothed and sometimes the upper margin produced into a short sharp finger, sides straight and entire, many-nerved and lacking definite midrib, glabrous, surfaces bearing no spines: inflorescence erect; peduncle slender, 5–7 mm. thick, 1 m. or more long, armed with sharp prickles 15 mm. or less long, lower half inside narrow sparingly weak-prickly spathe-valves, upper or flowering free part 40–50 cm. long, axis angled and dark pubescent, the simple slender branches or rachillæ 30–40 cm. long and strongly ascending; flowers close together along the rachilla, the lower or pistillate ones lightly sunken in shallow cavities, the upper smaller staminate ones superficial; pistillate flowers about 4 mm. thick and 5–6 mm. long; staminate flowers in full bud about 3 mm. either way: fruit not seen.

Cloud forest, on hills above Campana, Province Panama, 600–800 m., *Allen 1870*. Readily distinguished by the dark or fuscous pubescence of flowering branches as well as less markedly of peduncle and leaf-rachis.

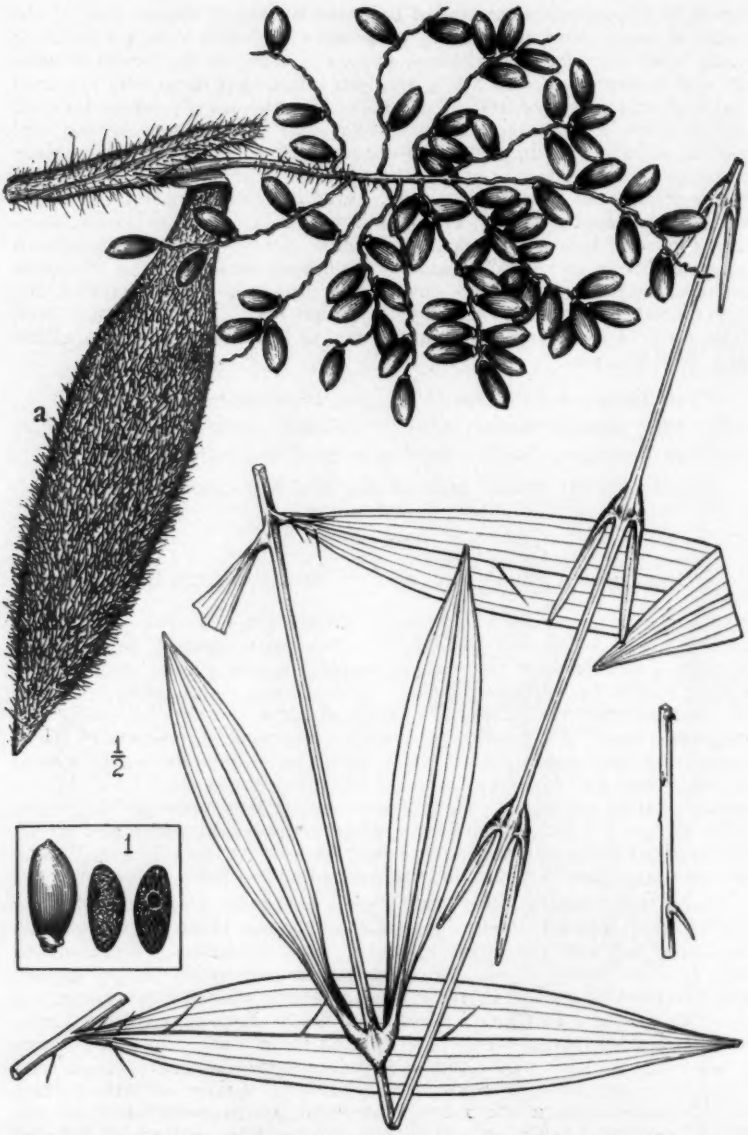
I pronounce the generic name as if spelled A-if′-an-ees.

DESMONCUS

† **Desmoncus isthmius,** spec. nov. § Orthacanthium. Fig. 108.

Longi-repens et ascendens; trunci 1–2.5 cm. crassi, glabri, nudi: folia 2 m. longa, glabra, pinnata; petiolus et rachis acute angulati, paucis, rectis spinis 1–2 cm. longis et rare valido, uncinato aculeo 3 mm. longo; vagina striata, multis fuscis planis spinis 5 mm.–2.5 cm. longis, pinnæ alternæ vel pinnæ superiores oppositæ, longo-lanceolatæ, acuminatæ, 15–24 cm. longæ, 2.5–4 cm. latæ, margines inermes, costa media prominens et ferens brevem spinam medio subter, venæ laterales indistinctæ: major cymba 24 cm. longa 5–6 cm. lata, tecta atratis albo-basatis setis 1 cm. longis; spadix anthesi 12–15 cm. longa: fructus ellipsoideus, pæne vel admodum 2 cm. longus et 8 mm. vel plus latus, glaber; cupula non prominens, corolla multo major quam annulatiformis calyx; semen 13–14 mm. longum, 6 mm. crassum, angusto-oblongum, illustratum raphalibus lineis, 2 pori in dorso.

Long trailer and climber; trunks 1–2.5 cm. thick, glabrous and nude: leaves 2 m. long, with many large alternate pinnæ becoming opposite on the upper part where they pass into 3 or 4 pairs of retrorse glabrous strong heavily based spines 3.5–4.5 cm. long; petiole and rachis sharply angled, glabrous or at places slightly furfuraceous, bearing a few straight spines 1–2 cm. long with now and then a stout broad-based sharp curved hook 3 mm. long; leaf-sheath many-striate and bearing many dark brown flat spines 5 mm.–2.5 cm. in length; pinnæ long-lanceolate-acuminate, 15–24 cm. long, 2.5–4 cm. broad at middle, glabrous both surfaces or with a trace of puberulence underneath, margins unarmed, midrib pronounced but the several side-veins indistinct, upper surface sometimes marked by elevated cross-lines, usually a spine 1.5–2 cm. long borne on midrib underneath at



108. LEAF, FRUITING SPADIX of *Desmoncus isthmius* of Panama. Setose spathe at *a*. Fruit at lower left. Midnerve spine at lower right.

about the middle or toward the base: main or inner cymba 24 cm. long, 5–6 cm. broad, densely covered with blackish white-bottomed spine-like setæ 1 cm. more or less long; primary spathe short and narrow; sheath of openly woven fibers and many blackish spines; spadix at anthesis 12–15 cm. long and 10 cm. broad, the glabrous rachillæ later extending and likely to be fertile to the ends: fruit ellipsoid, nearly or quite 2 cm. long when dry and 8 or more mm. broad, abruptly pointed, glabrous; cupule not very prominent, inner series undulate or lightly indented and much more extended than the small ring-like calyx; seed 13–14 mm. long, 6 mm. thick, narrowly oblong, closely reticulated with light colored rapheal lines issuing from the central micropyle that attaches to the outer shell of the fruit, and 2 pores prominent on the back.

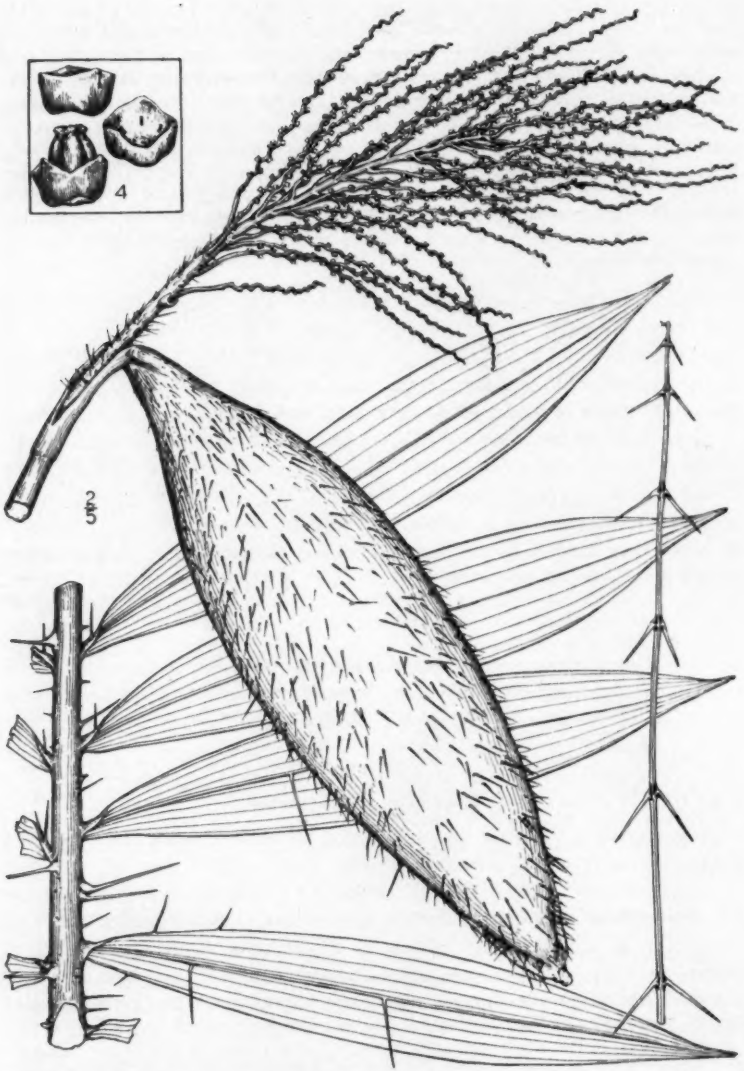
Panama, probably widespread. Marraganti and vicinity, *R. S. Williams 691* (type, Herb. N. Y. Bot. Gard.), "stems many rods long, trailing over trees"; Chivi-Chivi Trail, two miles above Red Tank, Canal Zone, *Maxon & Harvey 6573* (U. S. Nat. Herb.); also on Barro Colorado Island. The species presents several manifestations in leaf shape.

The plant at the Bronx, *Williams 691*, on three sheets (which I take as the type of *D. isthmius*) is ticketed *Desmoncus panamensis* Linden? The Linden name is only a *nomen nudum* in l'Illustration Horticole, xxviii, 16 (1881) and cannot be identified. It was listed as coming from Colombia, of which Panama was then a part. *D. grandifolius* and *D. Wallisi* are other names mentioned at the same place.

Study of Desmoncus in Panama has naturally led to examination of material from other countries. I have been particularly attracted to the situation on the island of Trinidad, British West Indies, inasmuch as I have collected Desmoncus there and I now have under my hand the official old palm herbarium of the Colony of Trinidad and Tobago. We have been in error on the Desmonci of that territory.

One species, *Desmoncus major*, Crueger, has been described on Trinidad; it has been referred by Burret (in Fedde, Repert. xxxvi, 205, 1934) to the South American *D. horridus*, Splitgerber. This reference is at least doubtful, if we follow the original account in Martius, and the minute detail in fig. Aiii in t. 165 (the only picture of *D. horridus*) is not convincing. I prefer to keep *D. major* separate, considering the evidences and the distribution. Moreover, there are two species (at least) on Trinidad, and they must be contrasted.

To understand Desmoncus we must distinguish two sections: *Orthacanthium*, Burret, with straight spines on the cirrhous extension of the rachis, representing modified pinnæ or leaflets, as well as bearing other slender straight spines; *Campylacanthium*, Burret, bearing curved aculei



109. Spadix, hanging spathe, part of leaf and its whip-like end of *Desmoncus major*. At top left, pistillate flower, and on right the minute staminodia in the corolla-cup.

or prickles on rachis or other parts and not morphological pinnæ, commonly in addition to the pinnular spines.

For Trinidad, one must be aware, also, of the existence of Herbarium List, Botanical Department, Trinidad, by J. H. Hart, F. L. S., Superintendent, published at Port-of-Spain in 1908. This is a catalogue of eighty-nine pages, of "actual specimens mounted, classified, and arranged under their Natural Orders in new Cedar Cabinets." A new but undescribed species of Desmoncus is in this catalogue, and I give it name and diagnosis.

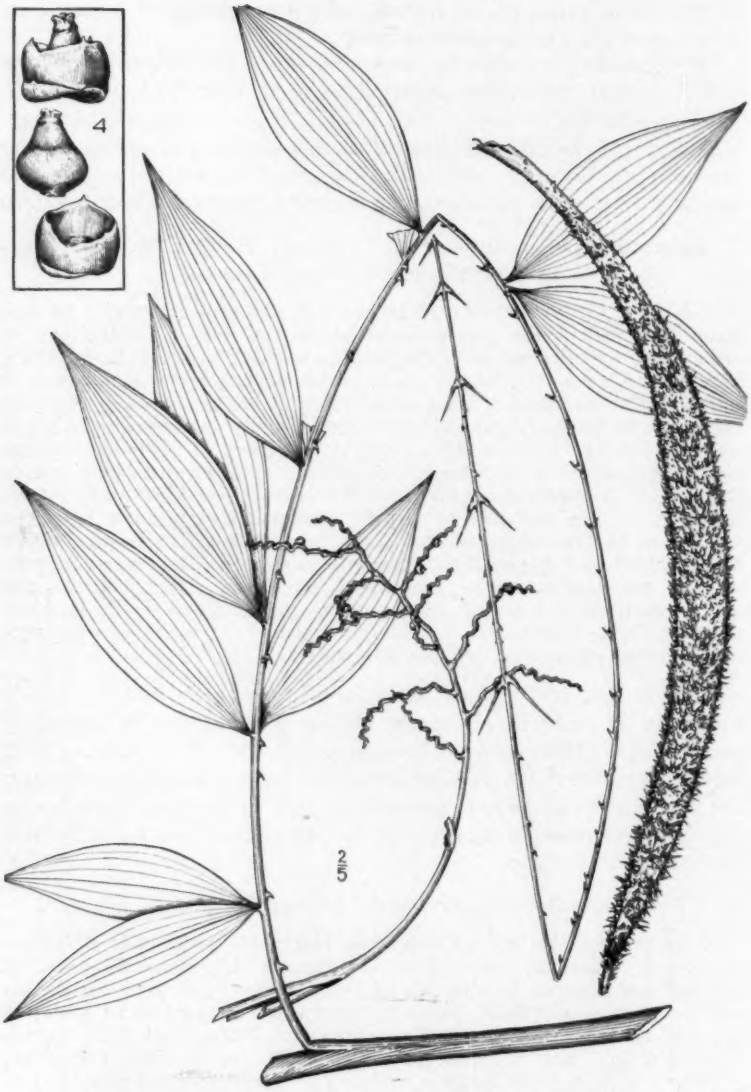
Desmoncus major, Crueger ex Grisebach, Fl. Brit. W. Indies, 519 (1864). § Orthacanthium. Fig. 109.

Glabrous vigorous climber, uncinate but not aculeate: leaf 1 m. and more long, with angled and grooved petiole and rachis; pinnæ many on either side, opposite and alternate, firm in texture, narrowly lance-oblong and pointed, 20–25 cm. long, 4–5 cm. broad, strongly nerved, narrowed to base, light green in color, often with 1–3 stout black spines 2–3 cm. long on midrib underneath and the pinna itself usually subtended by a much longer spine, the cirrhous whip carrying 5–6 pairs of big-based retrorse stout spines about 3 cm. long or even longer: spadix 30 cm. long and 20 cm. broad, the continuing aculeate rachis bearing several or many lateral unarmed rachillæ, peduncle not armed; cymba (spathe) 30 cm. long, 5–6 cm. broad at expansion and becoming more or less flat, bearing many small white-based spines of differing lengths of which the longest may be 15 mm.; pistillate flowers 4–5 mm. apart, about 2 mm. high, consisting of a very small calyx, a cup-like gamopetalous lightly lobed corolla attached to which on the inside are 6 elongated staminodia and inclosing a protruding columnar pistil: fruit not seen or described.

Distribution on Trinidad not recorded. Grisebach mentioned only Caroni on the authority of Crueger. Britton collected it at Balandra Bay and Swabey at Point Radix. I have taken it in the wild at Mayaro. Hart lists two numbers in the Trinidad herbarium, both of which are before me, but one of them is the new species I am now to describe. There are no Grisebach specimens of *D. major* in the herbarium of the Royal Botanic Gardens, Kew, England.

† **Desmoncus Prestoei,** spec. nov. § Campylacanthium. Fig. 110.

Gracilis, scandens, glaber, ferens et pinnulares rectas spinas reflexas in parte terminali rachidis et breves lato-basatos validos uncinatos aculeos in rachide spathaque: folia circa 1 m. longa; pinnæ oppositæ vel subopposite, inermes, elliptico-lanceolatæ, acutissimæ, angustatæ ad basim et spinis non subtentæ, valde nervatæ, circa 15 cm. longæ, 4 cm. latæ, vaginæ brevi-spinosæ et aculeatæ: spadix 30 cm. longa, 2–3 cm. lata, cylindrica; rachillæ tenues, 3–8 cm. longæ, undulatæ; flores pistillati 2–4 mm. inter se distantes, 2–3 mm. alti, calyx non profundus et latus, corolla gamopetalosa et undulata: fructus ellipsoideus, glaber, 20 mm. longus, 15 mm. diam.; semen 15–16 mm. longum, multi-venatum, micropyla subbasalis.



110. LEAF, SPADIX, SPATHE of *Desmoncus Prestoei* of Trinidad. Pistillate flower, pistil, corolla-cup at upper left. Note the hooked spines as well as the long straight foliolar spines.

Apparently a more slender climber than *D. major*, the glabrous stems often or usually reddish: leaf with the whip about 1 m. long, rachis slender and angled and provided with many small stout recurved prickles 5 mm. or less long, the whip also with prickles and a few pairs of slender pinnular spines; pinnæ several pairs opposite or subopposite, spineless and otherwise unarmed, elliptic-lanceolate and sharp-pointed, narrowed to base and not subtended by spines, about 4 by 15 cm. in dimensions, strongly nerved, leaf-sheaths variously prickly and short-spiny and the veining usually

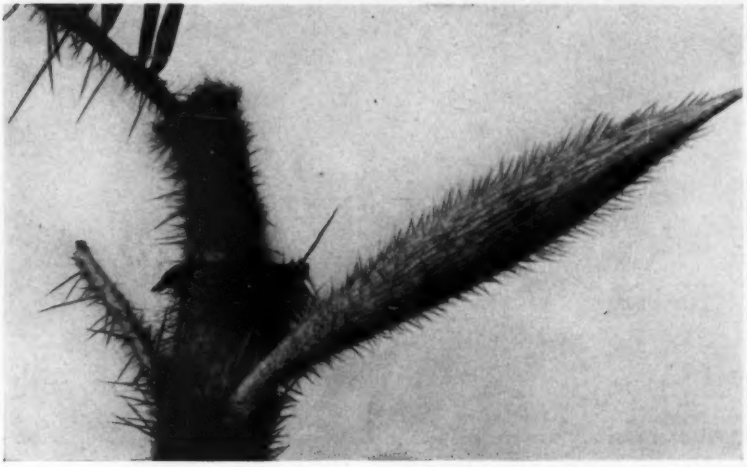
111. CHARACTERISTIC CLUMP of *Bactris minor*, at Cartagena, Colombia, where it was discovered about 175 years ago by Jacquin.

curved: spadix to 30 cm. long and not much if any exceeding 10 cm. broad, the cymba or spathe long and narrow and nearly cylindrical and not much flattened when open, perhaps not more than 2–3 cm. thick, covered with many short hooked broad-based prickles and little protuberances; rachillæ slender, 3–8 cm. long, very undulate; pistillate flowers 2–4 mm. apart, 2–3 mm. high, calyx shallow and broad, corolla bowl somewhat undulate on margin and containing a stout columnar pistil scarcely exserted: fruit ellipsoid, glabrous, 20 mm. long and 15 mm. broad, shell tenuous and loose from the large veiny seed, micropyle subbasal.

Trinidad, localities not always stated; now represented in the official Trinidad herbarium by ten sheets collected from 1865 to 1920, the latter date "climbing on Maximiliana," O'Meara Savanna *Britton & Hazen 1559*, in 1933 at Matura by *R. C. Marshall 12827*. In the Hart catalogue this plant is listed (without description or comment) as *Desmoncus minor*, Prestoe, three sheets of number 5568 collected by W. E. Broadway; two of these sheets are still in the collection and I accept the number as type of the species. The name *D. minor* was awarded by Henry Prestoe, former Government Botanist and Superintendent of the Botanic Garden. Under the Rules *nomina nuda* are not to be taken up either as established names or synonyms, and I therefore associate Prestoe's name with the interesting and neglected palm that he recognized.

BACTRIS

Before we attach ourselves to the excessive genus Bactris, in which



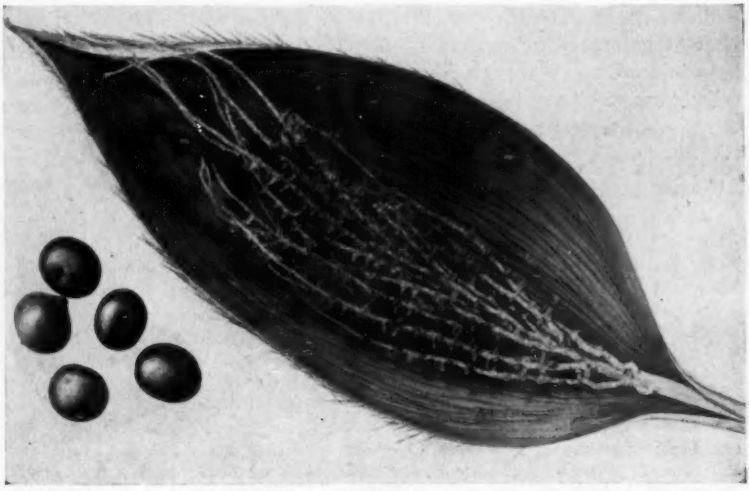
112. SPATHE NOT YET OPENED of *Bactris minor*. ×½. Colombia.

about 200 species already are known, we must be sure of our beginnings. These beginnings were laid at Cartagena in Colombia where Nicholas Joseph Jacquin obtained *Bactris minor* and *B. major* sometime in the years 1754–59 and who published them in 1763. In my Panama paper of 1933 (Gent. Herb. iii, fasc. ii) I said that "we are none too certain of the plant intended as *minor* and the other [*major*] is still more in doubt." In 1935 I visited the Cartagena region for the express purpose of rediscovering these bactrids in their original territory, after a lapse of 175 years; I now make the first report on the results of that fruitful journey.

The two original bactrids are now described from my notes and specimens made in the Cartagena neighborhood, with a few photographs. Other photographs unpublished are not essentially different.

Bactris minor, Jacq. Select. Stirp. Amer. Hist. i, 279, t. 171 fig. 1 (1763). Figs. 111, 112, 113, 114, 115.

Cespitose very prickly pinnate-leaved palm reaching 3–4 m. in height but sometimes bearing when only 1–2 m. tall on hard land, growing in close clumps of many (6–25) erect and ascending pithy culms about 2 cm. diam. inside the long short-prickly and woven leaf-sheaths, the clump spreading out in vase form when in vigorous growing condition and culms multiplying on brief stolons: leaves light green, 6–10 dm. long, bearing 20–30 or more pinnæ on either side in subopposite arrangement and with a few vacant spaces along the rachis; visible petiole 4–7 cm. long and armed

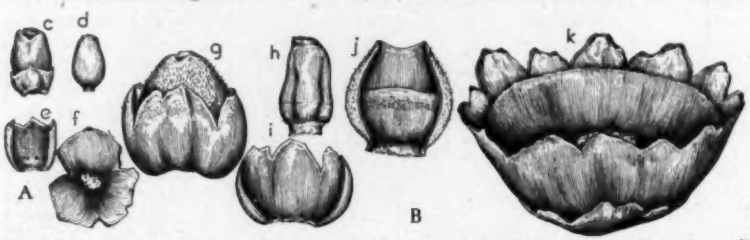


113. SPATHE HOLDING THE SPADIX of *Bactris minor*. ×½. Colombia. Ripe fruits. The rachillæ bear pistillate flowers; naked ends are now devoid of staminate flowers.

with angled divaricate slender very sharp spines 3–6 cm. long, lower part of petiole expanded underneath the webby sheath; rachis furfuraceous-pubescent, becoming more or less glabrous, bearing frequent long spines; pinnæ glabrous, or perhaps at first somewhat furfuraceous at base, easily deciduous on drying, linear and slender-pointed, 20–30 cm. long, 10–15 mm. broad, not glaucous but somewhat lighter colored underneath, midrib very prominent, many side-veins close together and of two thicknesses, margins minutely setulose: spadix about 15–20 cm. long, most of the peduncle buried in the sheath, the cymba closely pubescent and beset with sharp setæ 3–8 mm. long; inflorescence part of spadix about 10 cm. long, carrying simple pubescent rachillæ on all sides of the rachis, staminate flowers being at the apex; flowers compacted, not sunken, angular as they are pressed together; staminates about 5–6 mm. long at point of expansion, the 3 calyx-lobes very narrow and pointed and about one-third or one-half that length, corolla gamopetalous and deeply lobed with lobes valvate, stamens 6 attached near base of corolla-tube, anthers dorsifixed; pistillates a little shorter, 3-angled, calyx very short and tubular or cupulate, corolla tubular and much exceeding calyx and bearing minute staminodia on inside: fruit oblate with a brief beak, smooth, black and somewhat shining at maturity with a purplish undercolor, about 16 mm. high and 19 mm. broad, varying somewhat on different colonies, borne toward base of rachillæ the sterile ends of which are prominent in the cluster; sarcocarp and mesocarp thick; seed about 8 or 9 by 11 mm.

"Habitat passim prope Carthagenam," *Jacquin*. I found it rather abundant in several places about Cartagena on low or moist flat land, often in swampy areas, as along the farther part of Mamonal road leading to the sea, and on Barranquilla road beyond Tesca. I saw several clumps with straight bare dead canes standing about 10 feet tall as if the colony had been injured, and new growths were coming up at base. I heard the plant called "corocito" and "corozo de lata."

Range of *Bactris minor* is not well understood, inasmuch as other bactrids have apparently been confused with it. Dugand attributes it to Atlántico and Magdalena in Colombia, as well as to Ríohacha and Sinú.



114. DETAILS OF FLORAL PARTS of *Bactris minor* at A (four items) and of *B. major* at B (five items), × about 4 times enlargement. c, pistillate flower, with calyx-cup and corolla-cup; d, pistil; e, corolla-cup with minute staminodia at base; f, cupule of fruit; g, pistillate flower of *B. major*; h, pistil; i, calyx-cup open; j, corolla-cup with staminodal apron; k (right), cupule of fruit, the apron extending nearly to the top.

I have photographs from him showing *B. minor* taken near Cartagena, and "El Paraiso" near Ponedera extreme lower Magdalena valley. I have collected what I take to be this palm along the Orinoco in Venezuela in the vicinity of Ciudad Bolivar, a coloniate plant 8-10 feet tall.

In Panama this species is represented by *B. oraria*, growing on beaches, distinguished by its clambering or scandent habit, very slender canes sometimes 20 feet long and bearing the few leaves in a tuft at the top, fruit yellow, broader and flatter and becoming much wrinkled when dry because more sarcose.

This species, *Bactris minor*, is recognized by the gray-green foliage, tendency of the pinnæ to fall off in the plant press, relatively short and narrow pinnæ, and its upright condensed clumpy habit.

Bactris major, Jacq. op. cit. 280, t. 171, fig. 2. Figs. 114, 116.

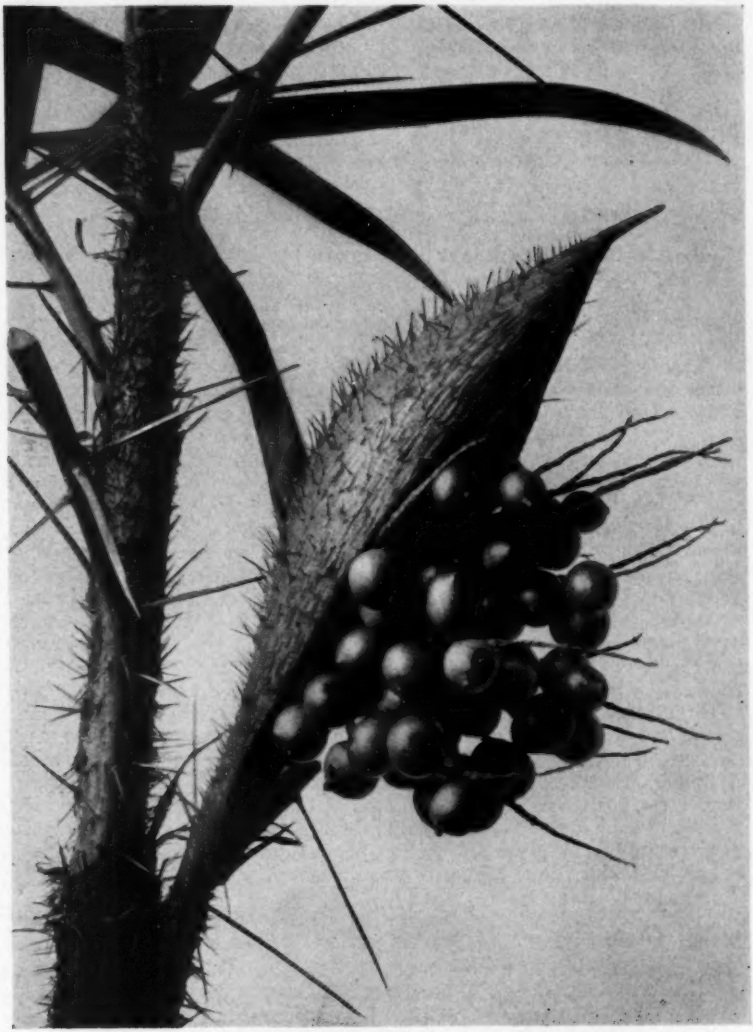
Augustinea major, Karst. in Linnaea, xxviii, 935 (1856).

Pyrenoglyphis major, Karst. Fl. Columb. ii, 141, t. 174 (1866).

Larger species than *B. minor*, reaching 6–8 m. tall, producing many canes or trunks 5 cm. in diam., the bole becoming smooth of thorns and white-ringed: leaves very large, 2–2.5 m. long, dull green, glabrous; petiole 40–50 cm. long, erect, terete, heavily armed with spines of different lengths, more or less furfuraceous; rachis very strongly angled and furrowed, somewhat furfuraceous, bearing many slender spines 4–7 cm. long; pinnæ 30 and more on either side, borne not on opposite sides of rachis and not definitely paired, glabrous except conspicuously setulose on margins, 40–65 cm. long, 2–3 cm. broad, slender-pointed, midrib strong, side-veins also conspicuous: spadix arising from armed coarsely woven sheaths, 30–40 cm. long, surface of cymba essentially glabrous although bearing scattered short stiff hairs and many weak setæ 1–2 cm. long; peduncle curved, compressed, closely setose-prickly toward the top, the glabrous rachillæ 8–12 cm. long and arising near top of peduncle: pistillate flowers (and fruits) borne at intervals along the rachillæ and the sterile ends hardly showing in the fruit-cluster, these flowers large at anthesis, about 4 mm. across, calyx 8-lobed; corolla hirsute at apex and becoming lobed as it emerges, the inside of it bearing an apron or membrane about one-half its height (presumably a staminoidal ring) that persists in the cupule of the drupe: fruit elliptic-ovoid, about 4–5 cm. long and 3.5–4 cm. thick, becoming conic-ovoid when dried, glabrous, papillate or flecked, purplish when ripe, the conspicuous double cupule crenate-dentate; seed large, oblong-ellipsoid, pointed, 3 pores prominent.

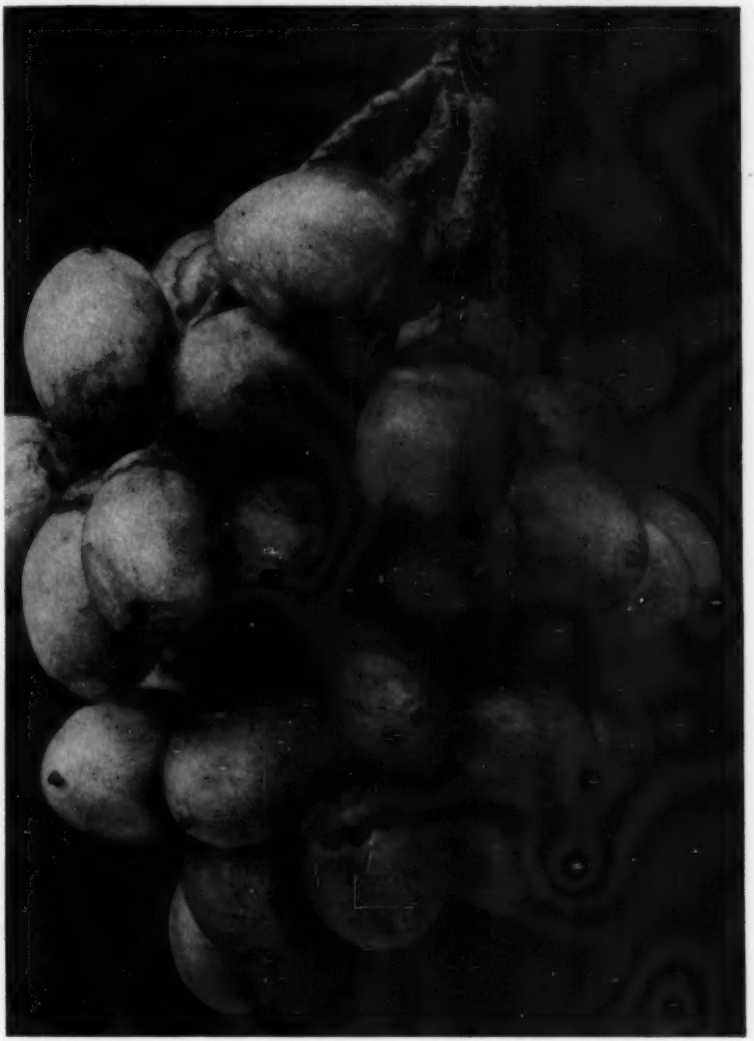
"Habitat Carthagenæ in sylvis," *Jacquin*. My specimens came from Mucura, near Cartagena, where they grew along an arroya on rather high land. Dugand gives it a wide range in Colombia. Outside Colombia it is accredited to Venezuela; also Trinidad and Tobago, and westward in Panama. The late Alfredo Jahn (whom I knew in younger years) says it is common in the warm parts of Venezuela in his Las Palmas de la Flora

Venezolana, 1908, although it is not included in R. Knuth, Initia Floræ Venezuelensis, 1928; neither one includes *B. minor*. Burret attributes it to the Maracaibo and Moporo regions of Venezuela on the authority of Engel.



115. FRUITING SPADIX of *Bactris minor*. ×⅔. Colombia.

I have taken it on Trinidad and have access to good material in the Trinidad palm herbarium now in my keeping, although I have been in doubt whether this insular palm is really the same species as the Cartaginian one. Freeman



116. Representative fruit-cluster of *Bactris major*. About natural size. Colombia.

and Williams in Useful and Ornamental Plants of Trinidad and Tobago, 1927, speak of it as "growing in wet places" and state that "the stems are used for laths and for forming the framework of tapia plastering to houses." Burret assigns *B. major* to Tobago on the collections of Eggers and Broadway. In Panama *B. major* may be represented in *Pittier 6756*, Province of Panama, and *2780* in forests along the Rio Indio de Gatun, Canal Zone; and perhaps also by *Allen 42*, Rio la Maestra, Province of Panama.

Long after the days of Jacquin the genus Bactris was split in twain, these two original species being placed in different genera. This was the work of Hermann Karsten who founded a genus Augustinea, named in honor of Herr Augustin a prominent grower of palms under glass in Germany. The distinction between Bactris and Augustinea was based primarily on the urceolate calyx of the latter. This was in 1856. Oersted working on the palms of Central America in 1858 accepted the name and the separation, adding other species. Finding that St. Hilaire and Naudin had earlier founded a genus Augustinea in the Melastomaceæ Karsten in 1869 proposed the name Pyrenoglyphis in its stead. This latter name was not accepted by Bentham & Hooker or by Engler & Prantl or Barbosa-Rodriguez, or by Drude in Flora Brasiliensis. It had been taken up subsequently by certain American writers. In 1934 the name Pyrenoglyphis was adopted by Burret (Fedde, Repert. xxxiv, 241) and thirty species were transferred to it. He distinguishes Pyrenoglyphis from Bactris by a staminodal ring in the pistillate flower, whereas in Bactris proper the staminodia are either lacking or indistinct and at all events are completely distinct from each other and do not form a ring.

These staminodal differences are marked between my material of *Bactris minor* and *B. major* collected at Cartagena. The illustration, Fig. 114, shows them. I have not accepted the generic division Pyrenoglyphis although as I said in my Panama palm paper, 1933, "my inclination has been to keep" it; I have awaited "much more and better material." I have now seen a wider range of material than was available to me ten years ago and have collected the original species. I cannot yet ascribe generic value to the morphological differences I have mentioned, however, nor have I found them to be uniform; and the genus Bactris as it stands is so homogeneous that segregation does not clarify it. The outstanding large similarities in the genus dominate these small differences.

Pistillate flowers of both Bactris and subgenus Pyrenoglyphis comprise one floral cup or tube inside an other, representing calyx and corolla. The *Bactris minor* pistillate flower has an exserted or columnar corolla-tube, lightly notched or erose at apex; if this tube is laid open, minute separate staminodia are discovered, in Fig. 114e. These staminodia soon perish and

117. TWO SIMPLE LEAVES, SECTION OF THE JOINTED TRUNK, SPATHE AND OLD SPADIX of the small and slender *Bactris paula*.

when the persisting floral envelope at base of fruit is examined, on the interior are no remains of them, the inside of the envelope being only prominently veined. The envelopes are not strongly accrescent or enlarging, and they form a very small body not inclosing the narrow base of the fruit, the small lobes usually divaricate or even somewhat reflexed. These features are distinct from the period of the pistillate flower-bud to the fully grown fruit, and need not be mistaken.

Pistillate flower-bud in subgenus Pyrenoglyphis is mostly larger, conical rather than columnar, the corolla little if at all exceeding the calyx. If the corolla-tube is opened one may expect to find within it something like an inner corolla or continuous apron-like membrane supposed to be a staminodal ring; this inner structure persists in the cupule of the mature fruit and is readily observed. These features are shown in Fig. 114. The cupule itself is distinctly accrescent, forming a prominent permanent covering for the broad base of the fruit, as an acorn sits in its cup.

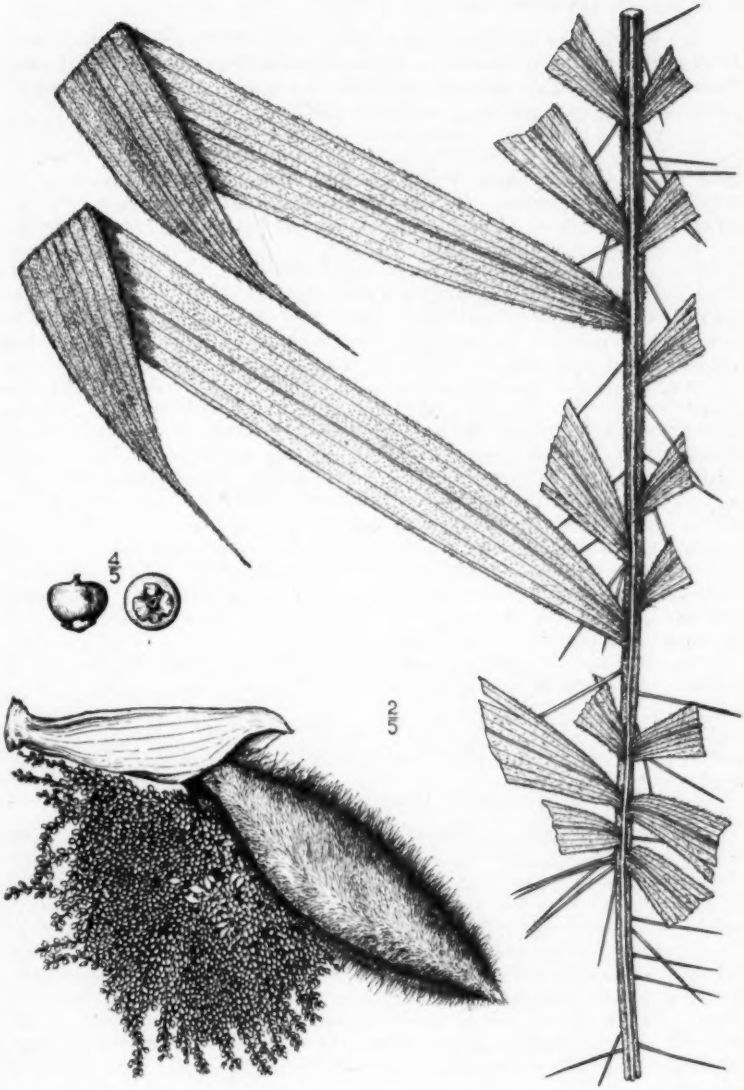
Karsten finds a ring inside the calyx-cup as well as inside the corolla-cup of *Bactris major* but I have not observed it; he calls these two organs half-calyx and half-corolla respectively (*halbe kelch*, *halbe blumenkrone;* Floræ Columbiæ, ii, p. 142, 1869).

† **Bactris paula,** spec. nov. Fig. 117.

Gracillima, pluribus vel multis culmiformibus truncis 2–2.5 m. altis et 1 cm. vel minus crassis, spinæ paucæ et mox evanescentes; nodi 4–5 cm. inter se distantes, internodi glabri et nudi: folia circa 3 ad culmum, simplicia, bilobata apice, molli-pubescentia subter, glabra supra et conspicuis venis transversis, costa media absens, aliæ costæ plures et prominentes; lobi 25 cm. longi, 7–8 cm. lati, apex longo-acuminatus, margines plus vel minus scabri: cymba 8–9 cm. longa, circa 3 cm. lata, sparse tecta setosis bulbosisque pilis: fructus globularis, læte ruber vel aurantio-coccineus, rostrum brevissimum.

Very slender with 3–6 or sometimes 10 culm-like stems or canes in a group or colony, 2–2.5 m. tall; trunk or cane less than 1 cm. thick, glabrous and smooth, nodes 4–5 cm. apart; plant bearing a few slender spines that soon weather away, leaving it nude: leaves usually 3 to a culm and near the top of it, simple but deeply bilobed, soft-pubescent underneath, glabrous above and with broken cross lines between the many prominent veins, midrib lacking on the lobes or divisions; lobes of leaf 25 m. long and 7–8 cm. broad, apex long-acuminate, margins with apiculate points; petiole 5–8 cm. long, scurfy-pubescent as well as the rachis; leaf-sheath narrow, striate, pubescent: cymba 8–9 cm. long, about 3 cm. broad at maturity, thinly covered with setose white-bulbose brown hairs: fruit globular, beak short, bright red or orange-scarlet, about 12 mm. diam.

Heavy forest, where it is infrequent, vicinity of La Mesa, El Valle de Anton, Province Coclé, about 1,000 m. elevation, *Allen 2567* (type), *2695*.



118. PILOSE LEAF, SPINY RACHIS, FLOWERING SPADIX AND SPATHE of *Bactris Alleniana*. Fruit, one at right showing cupule.

† **Bactris Alleniana,** spec. nov. Fig. 118.

Arundinacea, aliquid gregaria; truncus 3 m. altus, 2.5 cm. crassus, nodi circa 6–8 cm. inter se distantes, spinæ graciles, dispersæ, 1–2 cm. longæ: folia 1.5–2 m. longa, regulariter pinnata, conspicue aureo-hirsuta supra et infra et in rachide; pinnæ oppositæ et alternæ, 30–40 cm. longæ, 3–4 cm. latæ, apex caudatus, costa media et aliquot nervi laterales inermes; rachis albescentibus spinis 2–5 cm. longis: cymba 15–20 cm. longa, tecta fuscis pilis 1 cm. vel plus longis; fructifera spadix densa, circa 10 cm. longa et lata: fructus oblatus, 10–12 vel 14 mm. latus, planum in culmine, rostrum prominens, inerme et glabrum; cupula non profunda, lobi pauci et obtusi.

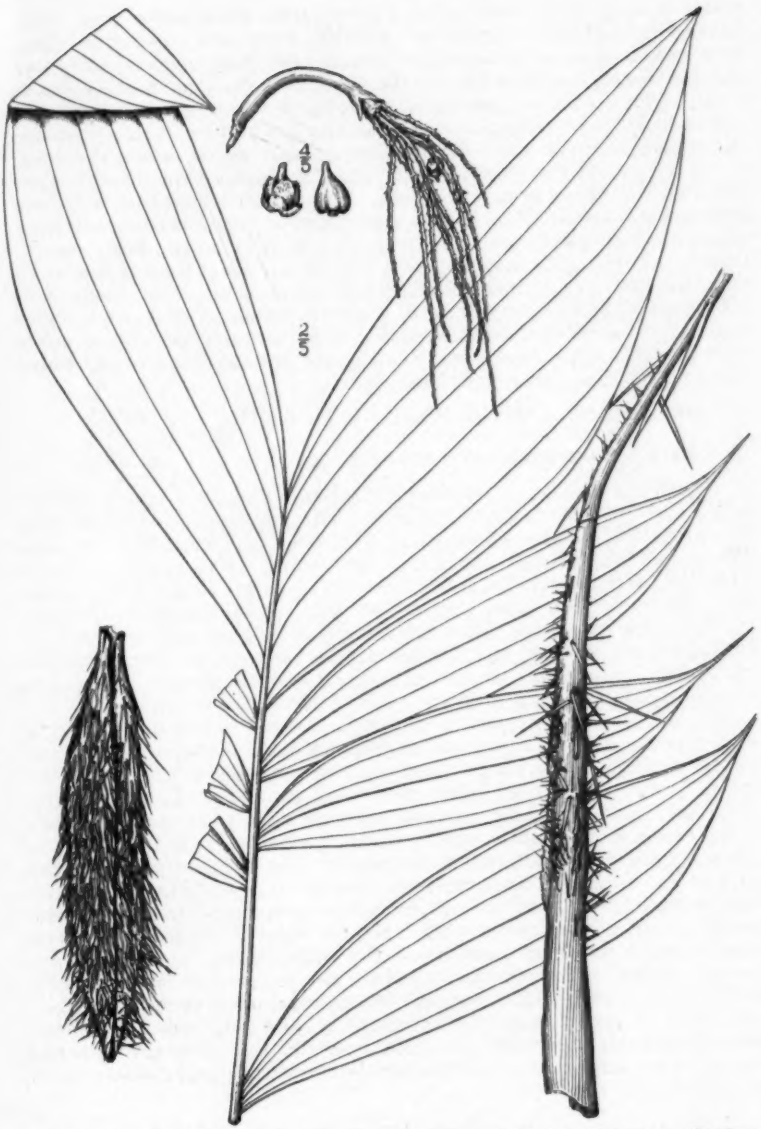
Trunks few to several, 3 m. tall and about 2.5 cm. thick at base, arundinaceous or cane-like, the prominent nodes about 6–8 cm. apart, with scattered very thin spreading spines 1–2 cm. long, canes pithy in cross-section: mature leaves 3–4 at apex of each cane, 1.5–2 m. long, soft or thin in texture, evenly pinnate, both surfaces and rachis conspicuously hirsute and exposing a golden glint in sunlight; pinnæ opposite and alternate, 30–40 cm. long, 3–4 broad, apex produced into a very slender tail-like extension, midrib not very prominent and attended on either side by 3 or 4 strong side-nerves, hairs numerous but particularly prominent on veins underneath, spineless; rachis very hirsute and bearing many light colored white-based spines 2–5 cm. long and which may be somewhat longer and more conspicuous on the petiole; leaf-sheaths conspicuously long, tightly clasping the cane, armed with both dark colored and light colored weak spines: cymbas or spathes attached among old leaf-bases on under side of crown, 15–20 cm. long, very densely woolly with tawny hairs 1 cm. and more long, the small outer or primary cymba little or not at all hairy; flowering spadix dense, about 10 cm. across either way, with very many slender rachillæ; staminate flowers pedicelled: fruit oblate, 10–12 or more mm. across, flat on top, beak prominent, unarmed, glabrous, striate; cupule shallow, with few obtuse lobes.

Hills north of El Valle de Anton, Province Coclé, elevation about 700 m., *Allen 1804*, *2574* (type), *2951*, in deep shade.

† **Bactris fuscospina,** spec. nov. Fig. 119.

Gracilis, arundinacea, 3 m. alta; truncus 1.5–2 cm. crassus, nodi circa 5 cm. inter se distantes, internodi pæne vel admodum nudi, spinæ fere brunneo-atræ et 2–3 cm. longæ: folia 1 m. et plus longa, irregulariter pinnata, lucida, glabra; petiolus armatus latis, fuscis, reflexis fusco-acuminatis spinis 4–4.5 cm. longis; pinnæ 12–16 in utroque latere rachidis, alternæ et vacuis spatiis, 20–25 cm. longæ, 2.5–9 cm. latæ, juga terminalis latissima, conspicue multi-costata et transverso-venata, margines inermes, apex acuminatus et interdum brevi-caudatus: cymba 15–20 cm. longa, tecta fuscis spinis 2 cm. vel minus longis; fructifera spadix 10 cm. longa et lata: fructus (immaturus) oblongo-conicus, prominenter rostratus, glaber; cupula 5 mm. alta, sepala pæne separata et striata, petala urceolata et setosa.

Slender, leafy, arundinaceous, 3 m. tall; trunk 1.5–2 cm. thick, pithy, nodes about 5 cm. apart and usually spiny on at least one side, internodes



119. LEAF, SPINY PETIOLE, SETOSE SPATHE, SPADIX of *Bactris fuscospina*. Pistillate flower and pistil at top.

nearly or quite nude, main spines mostly brown-black and 2–3 cm. long: leaves 1 m. and more long, glossy, glabrous, unequally and abruptly pinnate; petiole more or less scurfy or furfuraceous, very unevenly armed on the sheath with brown and tawny spines 5 mm.–3 cm. long; rachis glabrous or with traces of furfur, bearing on the lower part and petiole many broad tawny dark-tipped reflexed spines 4–4.5 cm. long; pinnæ 12–16 either side the rachis, alternate and with long unoccupied spaces, 20–25 cm. long, 2.5–9 cm. broad, the terminal pair much the broadest, midrib often not definite, other ribs few to several and very prominent and with indistinct cross-veins between them on the upper surface, margins unarmed, apex acuminate and sometimes short-caudate: cymba 15–20 cm. long, narrow, densely covered with tawny spines 2 cm. or less long; fruiting spadix 10 cm. long and broad, rachillæ indifferently pubescent: fruit (immature) oblong-conic, prominently beaked, glabrous; cupule 5 mm. deep, outer series of 3 nearly separate striate lobes, inner series deeper and urceolate with a nearly entire margin and the exterior prominently strongly setose (the setæ likely to perish with handling).

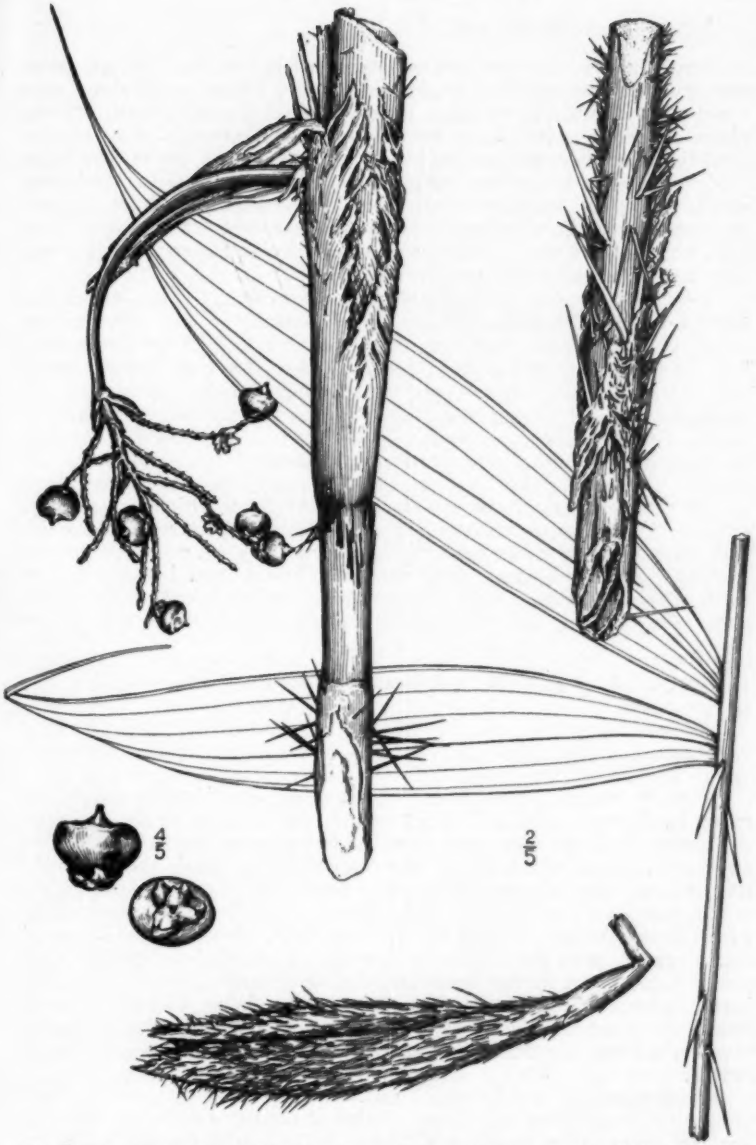
Cerro Campana, Province Panama, *Allen 2086*.

† **Bactris divisicupula,** spec. nov. Fig. 120.

Gracilis, 4 m. alta, arundinacea; truncus 2.5 cm. vel minus crassus, nodi 6–7 cm. inter se distantes, internodi nudi; folii vagina longa, vaginata, ferens fusco-albas planas spinas 3 mm.–4 cm. longas: folia lucida, glabra, 1 m. vel minus longa, alterna, interdum valde pauca, ferens spinas planas in nonnullis partibus rachidis; pinnæ inermes, 30–40 cm. longæ, aliæ 4–5 cm. latæ, aliæ 9–10 cm. latæ, anguste caudatæ, prominenter 5–7-nervatæ: cymba 15–20 cm. longa, dense tecta fusci-albis planis aculeis; fructifera spadix 8–9 cm. longa et lata, breves rachillæ pubescentes: fructus oblato-pyriformis, 11–14 mm. crassus et longus, culmen planum, rostratum, inerme, striatum; cupula divisa in 3 latos lobos extra et intra.

Slender, 4 m. tall, trunk arundinaceous, 2.5 cm. or less thick, pithy in center, nodes 6–7 cm. apart and the intervals nude, leaf-sheaths long and tightly closing and thickly provided with brownish-white black-based flat spines 3 mm.–4 cm. long: leaves glossy and glabrous, 1 m. or less long, irregularly pinnate, bearing flat spines between the pinnæ on some parts of the rachis and the pinnæ sometimes few; pinnæ 30-40 cm. long, some of them 4–5 cm. broad and others (particularly the terminal pair) as much as 9 or 10 cm. broad, apex slenderly caudate, the 5–7 prominent nerves widely spaced and the midrib not much more prominent than they; rachis nearly terete, glabrous except for indistinct lines of furfuraceous pubescence: cymba maturing often below the falling leaves, 15–20 cm. long, densely clothed with tawny flat prickles 2 cm. or less long; fruiting spadix short, 8–9 cm. across either way, the few short branches or rachillæ pubescent: fruit oblate-pyriform, 11–14 mm. thick, top flat, beak pronounced, surface glabrous and when dry faintly striate, thin mesocarp adhering tightly to the large nutlet; cupule strongly divided into broad lobes or parts in each series.

Northwest rim of El Valle de Anton, Province Coclé, about 600 m altitude, *Allen 1817*.



120. PINNÆ AND RACHIS, SPINY PETIOLE, SPATHE, FRUITING SPADIX, of *Bactrisdivisicupula*. Lower left, two fruits, one showing the cupule.

† **Bactris aureodrupa,** spec. nov. Fig. 121.

Pergracilis, 3 m. alta; truncus arundinaceus, 1–2 cm. crassus, paucis parvis nigratis spinis: folii vaginæ 20–25 cm. longæ. tenuissimis spinis 1–2.5 cm. longis: folia 1 m. longa, lucida, inermia præter fortasse in petiolo, glabra subter et leviter puberulenta supra; pinnæ 14–16 in utroque latere rachidis, alternæ prope apicem et dispersæ ad basim, 16–18 cm. longæ, 2–2.5 cm. latæ, longo-acuminatæ, costæ aliquot, margines hispidulosi: cymba 10–14 cm. longa, atrato-setosa; fructifera spadix 7–9 cm. longa et lata; rachillæ aliquid pubescentes: fructus aurantius, pyriformis, 12–14 mm. longus, 9–10 mm. crassus, glaber, rostrum minimum; cupula 3 mm. alta, margo integer vel aliquid irregularis.

Very slender palm, 3 m. tall; trunk arundinaceous, 1–2 cm. thick, bearing a few small blackish thin spines; leaf-sheaths 20 cm. or more long, closely clasping, armed with very thin spines 1–2.5 cm. long: leaves about 1 m. long, pinnæ irregular in attachment, very glossy on under glabrous surface, less glossy on duller upper surface which also discloses a very close puberulence under a lens; pinnæ 14–16 either side the slender puberulent rachis, with alternate attachment toward apex but scattered on lower part, unarmed but perhaps a spine or two on the petiole, the pinnæ thin in texture, 16–18 cm. long and 2–2.5 cm. broad, long-acuminate and very sharp, midrib not very prominent and accompanied by conspicuous nerves on either side, margins hispidulose: cymba 10–14 cm. long, appressed on middle with short blackish setose hairs; fruiting spadix 7–9 cm. across either way, rachillæ lightly pubescent: fruit pyriform, 12–14 mm. long, 9–10 mm. thick, glabrous, orange, beak so small as to be hardly noticeable; cupule about 3 mm. deep, with almost continuous and only notched or broken edges.

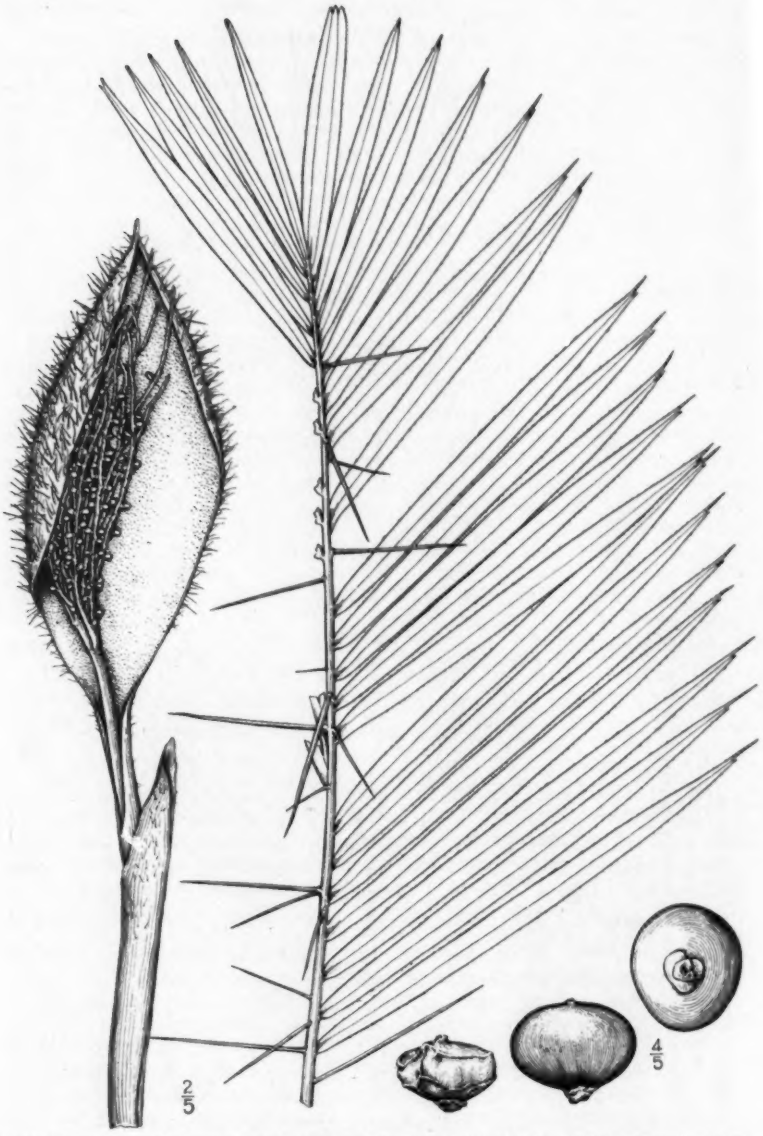
Hills, north of El Valle de Anton, Province Coclé, 1,000 m. elevation, *Allen 2150.*

† **Bactris oraria,** spec. nov. Fig. 122.

Gregaria, trunci 4–6 m. alti, 2–3 cm. crassi, erecti, procumbentes vel sæpe scandentes, cinereis foliis, spiniferi; folii vaginæ longæ, vaginatæ, imbricatæ, brevi-spinosæ: folia 5 vel 6 prope summum caulem, glabra, circa 1 m. longa; pinnæ 65–75, fere oppositæ sed vacuis spatiis; petioli circa 20 cm. longi, sparsis, glaucis, atro-acuminatis spinis 5–9 mm. longis et aliis spinis ad 6 cm. longis; rachis ferens spinas 2–8 cm. longas; pinnæ 12–20 (interdum 30) cm. longæ et 1–2 cm. latæ, pinnæ apice folii 10–12 cm. longæ et 9–12 mm. latæ, acuminatæ ad pungentem apicem, costa media evidens sed multæ venæ laterales indistinctæ: cymba 14–16 cm. longa, 6.5–7.5 cm. crassæ, multis et brevibus spinis; rachillæ 6–9 cm. longæ, glabræ: fructus oblatus, 18–20 mm. latus, 15 mm. altus, culmen planum, luteum, rostrum minimum, glabrum; cupula minima, lobata. striata.

Stems cane-like, usually about 4 m. but sometimes 6 m. tall, 2–3 cm. thick, not always erect but often twisting or almost scandent or procumbent on surrounding vegetation, foliage with a light grayish aspect, in colonies of many canes: leaves pinnate, nearly or quite 1 m. long, 5 or 6

121. LEAF, SPADIX, FRUIT of *Bactris aureodrupa*. Fruit at right shows cupule at base.



122. Leaf, spadix in its spathe, fruits of *Bactris ovaria*. Fruit at left is naturally dried.

in number and tufted at top of cane; petioles about 20 cm. long, flattened on upper surface and convex on lower surface, with sparse gray black-pointed spines 5–9 mm. long and a few flattened ones 2.5–6 cm. long; leaf-sheaths long, more or less imbricate, persistent, covering much of the cane, short-spiny, upper margins held together by fibrous network; pinnæ 65–75, mostly opposite but often with open intervals between them, small, 25–30 cm. long, 2.5–3 cm. broad, the upper ones sometimes only 10–12 cm. long and 9–12 mm. broad, acuminate to sharp points, glabrous, midrib marked but the many lateral veins hardly noticeable, margins scabrid; rachis bearing spines 2–8 cm. long: cymbas firm, interfoliar, persistent, expanded or protruding part of inner or main cymba 14–16 cm. long, 6.5–7.5 cm. wide, acuminate to slender point, bearing many short gray spines some of which may weather away; rachillæ 6–9 cm. long, terete, slender, glabrous: fruit oblate and somewhat irregular in circumference, 20–22 mm. across the long way, about 15–17 mm. high, very little tapered to base, top flat and beak very small, yellow, glabrous, strongly wrinkled when dry; cupule very small, strongly lobed, striate, scarcely applied to base of drupe.

Beaches just back of the sea sands, Nueva Gorgona, Province Panama, *Allen 2551;* vicinity of Farfan Beach, Canal Zone, *Allen 2580;* Tabeguilla Island, Panama Bay, *Allen 2543* (type); Trapiche Island off coast of Pedro Gonzales, Perlas Islands, *Allen 2614;* Aguadulce, Province Coclé, along outskirts of the tidal belt, *Pittier 4975.* See comment under *B. minor*, page 221.

CHAMÆDOREA—DOREA PALMS

The Chamædoreas (Chamædò-rea) are a confused group, of about 100 species, perplexing not only because of the many diverse forms but from the fact that the plants are diœcious and the collector may not recognize the two sexes; in fact, different species, sometimes in separate genera, have been founded on the staminate and pistillate plant of the same palm. Efforts in former time to break Chamædorea into differing genera have not been successful. The procedure has been based on small technical floral differences of one sex or the other, while habit and aspect of plant and distribution have been taken little into consideration. Along with these obscure technicalities have gone difficult titles, which according to O. F. Cook, "usually are disregarded, perhaps on account of forbidding names: Eleutheropetalum, Stachyophorbe, Psilostachys, Dasystachys, Stephanostachys, and Spathoscaphe": National Horticultural Magazine, xviii, 161 (July 1939). See Gent. Herb. iii, 80, 82 (1933).

Substantial division of Chamædorea into genera cannot proceed until a wide range of specimens is at hand, with both sexes and also mature fruits represented. We shall then be able to determine whether there may not be good organographical characters, and geographical ranges, to supplement the minute floral differences. The species are all American.

Even as it is, the multiform genus Chamædorea is singular in its dicœcious character, and there are other good marks of separation. Absence of floral scars of both sexes on the rachillæ constitutes a marked feature, at once recognizable even after the flowers themselves and the fruits have fallen.

Strange and confused similarities run through the many species of Chamædorea, and this fact together with the dicœcious separation renders it probably the most baffling of American palm genera. Under such circumstances the adventurer in new species assumes unusual risks.

† **Chamædorea coclensis,** spec. nov. Fig. 123.

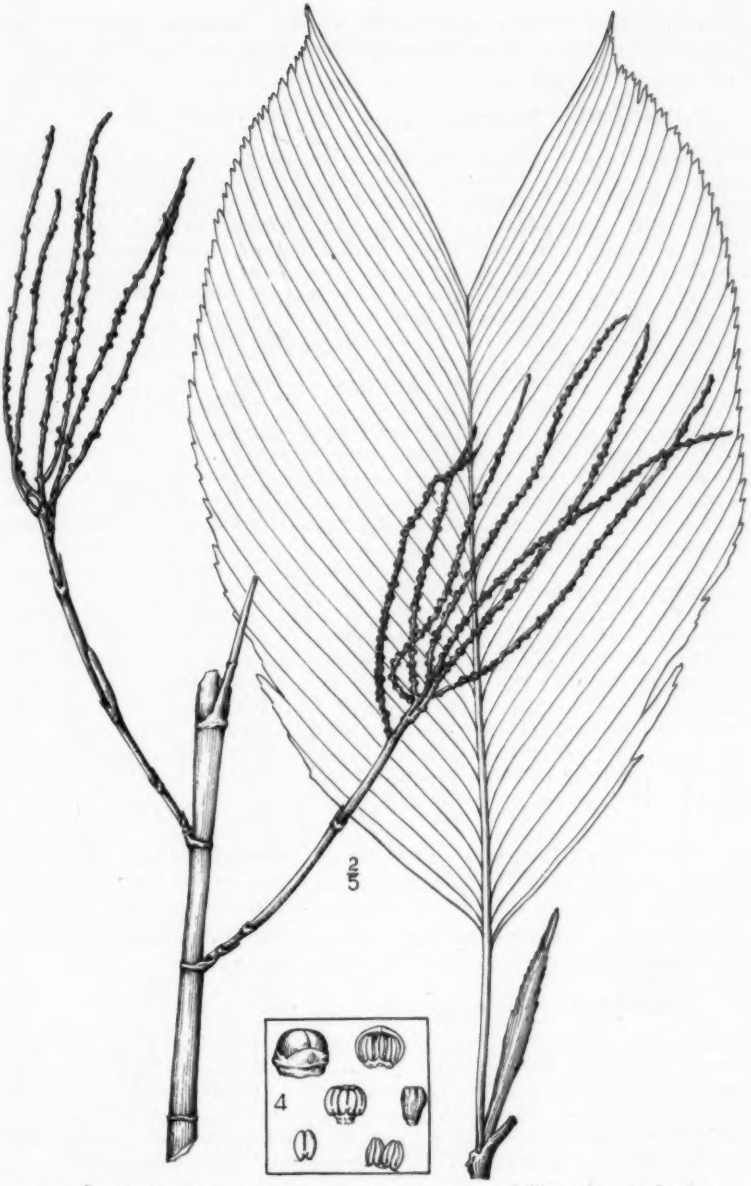
Tenuis, 1.5 m. alta, culmus 1 cm. vel minus crassus, annulæ 4 vel 5 cm. inter se distantes: folia pauca, simplicia, bilobata apice; lamina 30–40 cm. longa, 20 cm. lata, late obovata in ambitu, cuneata basi, glabra, lucida subter, margines conspicue serrato-dentati, costa pronuntiata, nervi laterales circa 25 in utroque lobo et 5 mm. inter se distantes: staminatæ spadices infrafoliares, ascendentes vel erectæ, pedunculus 10–12 cm. longus; rachis brevissima, rachillæ 6 vel 7, glabræ, 12–15 cm. longæ; gemmæ staminatæ circa 1 cm. latæ, obtusæ vel oblatæ, calyx integra cupula, petala valvata; pistillata spadix incognita: fructus lucidus, oblongus, obtusus, 12–13 mm. longus, 9–10 mm. latus.

Slender, 1.5 m. tall, the sheathed stem or culm 1 cm. or less thick, rings or nodes 4–5 cm. apart: leaves very few, simple and deeply 2-lobed at apex, blade 30–40 cm. long and 20 cm. wide, broadly obovate in outline, cuneate to base, outer margins on upper half conspicuously serrate or serrate-dentate, glabrous, glossy at least underneath, rachis prominent as a midrib particularly underneath, main lateral ribs about 25 on each side and 5 mm. apart and ending in sinuses of the serratures, prominent on upper face: staminate spadices few from separate nodes beneath the leaves, ascending, peduncle 10–12 cm. long and the bracts soon shedding; rachillæ 6 or 7 from near apex of peduncle, 12–15 cm. long, closely ascending, glabrous, strongly angled in drying, rather closely flowered; staminate flower-buds just preceding anthesis about 1 cm. across, obtuse or somewhat flattened, calyx a connate cup without evident lobes, petals valvate; pistillate sex unknown: fruit oblong, blunt, 12–13 mm. long and 9–10 mm. broad, smooth and glossy, the thin skin soon shattering.

Vicinity of El Valle de Anton, Province Coclé, Panama, 600 m., *Allen 1815* (Herb. Mo. Bot. Gard.).

This species has certain resemblance to *C. nana*, N. E. Br., but is less leafy, spadix infrafoliar, leaves much broader and with twice the number of lateral nerves, rachis of spadix shorter, rachillæ erect rather than drooping, staminate flower-buds much shorter and smaller.

This plant may belong to the subgenus (or genus) Eleutheropetalum, but pistillate parts are required for full determination. That genus has been held by Burret and others to comprise two species, *E. Ernesti-Augusti*



123. SIMPLE LEAF, TWO SPADICES, STAMINATE FLOWER of *Chamædorea coclensis*.

and *E. Sartori*, but it is questionable whether these two palms are congeneric (if separated from Chamædorea) or whether that small genus is yet properly defined.

† **Chamædorea Woodsoniana**, spec. nov. Fig. 124.

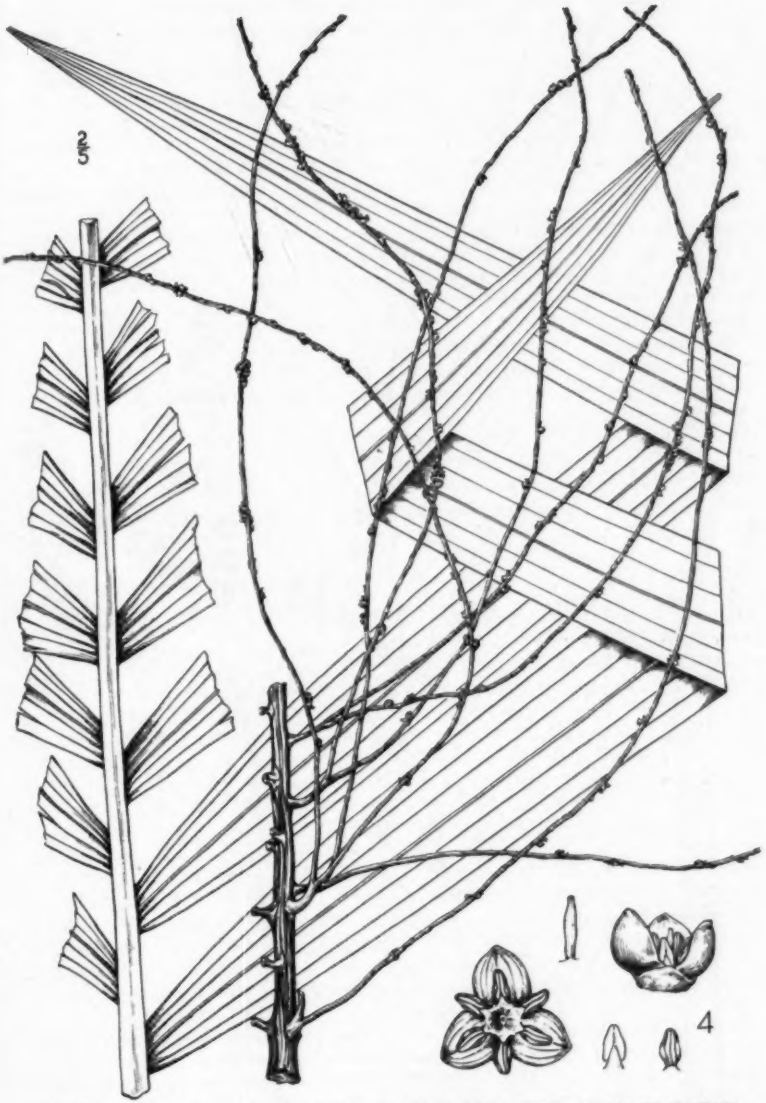
Valida, 5–12 m. alta; lamina 1 m. longa, 20 vel plus jugis oppositarum vel subopositarum glabrarum satis virentium pinnarum; petiolus 20 cm. vel plus longus super vaginam, valde sulcatus; vagina 30 cm. vel plus longa, lata et plana, multi-striata; pinnæ 60–65 cm. longæ, 3–5 cm. latæ in medio, recte angustatæ ad longum gracilemque apicem, conspicue costatæ, 5 majores costæ 5–7 mm. inter se distantes: spadix staminata magna et diffusa, 75 cm. vel plus longa et valde lata; rachillæ multæ, tenues et flexuosæ, 20–50 cm. longæ; spadix pistillata minor, 15–25 cm. lata cum matura: fructus globularis, 8–10 mm. diam., reticulatus cum siccus; cupula 6–7 mm. diam., profunde lobata.

Stout, 5–12 m. tall, slender: leaf-blade 1 m. long, with 20 or more pairs of opposite or subopposite long and large glabrous dark green pinnæ; petiole 20 cm. and more long above the sheath, strongly ridged on top and more or less triangular in cross-section; sheath 30 cm. and more long, stoutly many-striate, 3–4 cm. broad at middle, clasping the cane, narrowly winged at apex; main pinnæ 60–65 cm. long, 3–5 cm. broad or the upper ones less than 2 cm., gradually and straightly tapering into long narrow ends or the young upper ones slightly curved but not sigmoid and caudate, all conspicuously ribbed particularly underneath, the central rib more pronounced than the 2 others on either side, intermediate nerves not prominent, the 5 main ribs 5–7 mm. apart: staminate spadix or truss large and diffuse in anthesis, 75 cm. and more long and very broad, on a many-sheathed peduncle 30–65 cm. long, sheaths soon shreddy; rachillæ numerous, slender and flexuose, glabrous, simple or some of them once or twice forked, 20–50 cm. long, laxly flowered; pistillate spadix much like the staminate but rachillæ fewer, shorter and less diffuse, 12–20 of them 10–30 cm. long: fruit globular, 8–10 mm. thick in mature dry state, somewhat fleshy on exterior, becoming wrinkled and reticulate in drying, cupule about 6–7 mm. across and with very broad lobes.

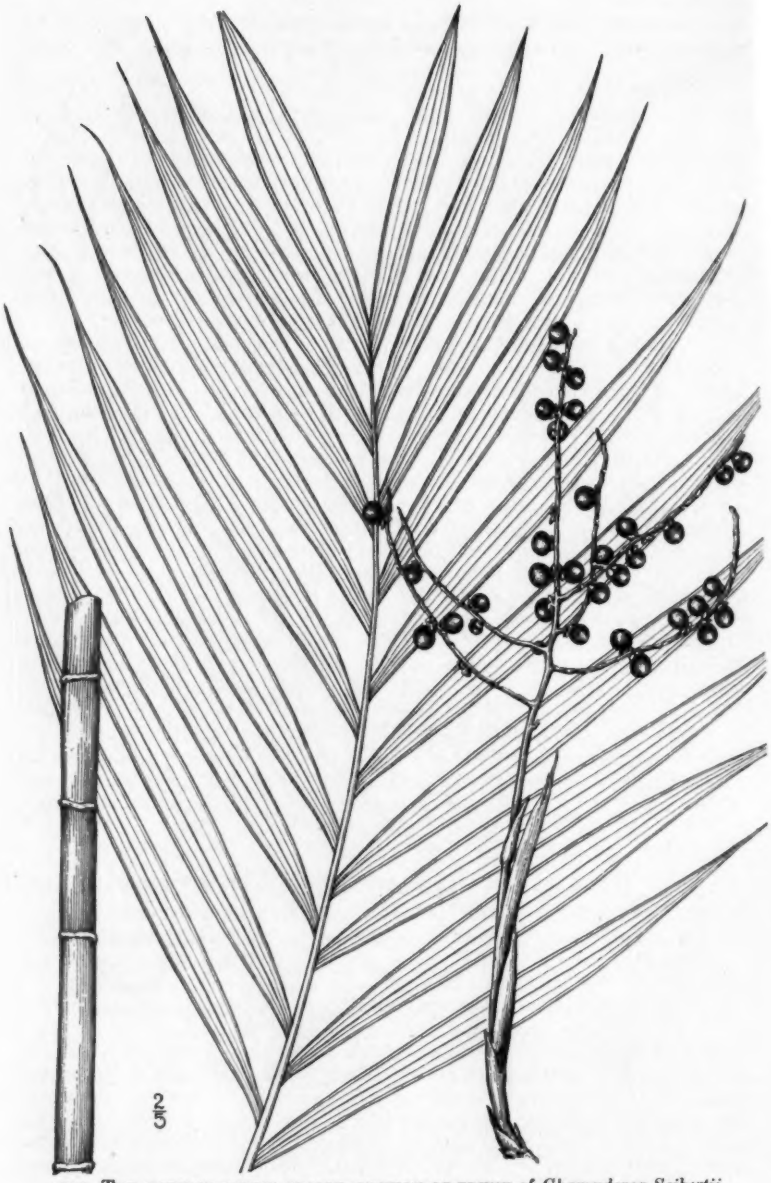
Vicinity of El Valle de Anton, Coclé, altitude about 600 m., *Allen 1901* (type), collected in 1939; Chiriqui in vicinity of Casita Alta, Volcán de Chiriqui, 1,500–2,000 m. altitude, *Woodson, Allen & Seibert 948*. Probably in Costa Rica. This plant has been confused with *C. macrospadix* and *C. costaricana*, both of which have sigmoid pinnæ.

† **Chamædorea Seibertii**, spec. nov. Fig. 125.

Gracillima, 2 m. alta, caules 1–2 cm. diam., annulati intervallis 2–3 cm.: lamina 50–90 cm. longa, 16–24 alternis vel subopositis jugis rectarum pinnarum; petiolus gracilis, 12–14 cm. longus super vaginam striatam; pinnæ lætevirentes, glabræ, 20–25 cm. longæ, 1–2 cm. latæ, gradatim angustatæ ad longum et tenue acumen, aliquid angustatæ ad basim, costa media prominens, plures nervi laterales conferti: spadix pistillata compo-



124. PART OF LARGE LEAF AND OF VERY LARGE SPADIX, WITH STAMINATE FLOWER DETAILS of *Chamædorea Woodsoniana*.



125. THE NARROW PINNÆ, SPADIX, SECTION OF TRUNK of *Chamædorea Seibertii*.

sita circa 6 aurantiis rachillis 6–12 cm. longis in rachide tantum 4–5 cm. longa: fructus globularis, olivicolor, 7–8 mm. diam., rugosus cum siccus; cupula parva, profunde lobata, 4–5 mm. diam.

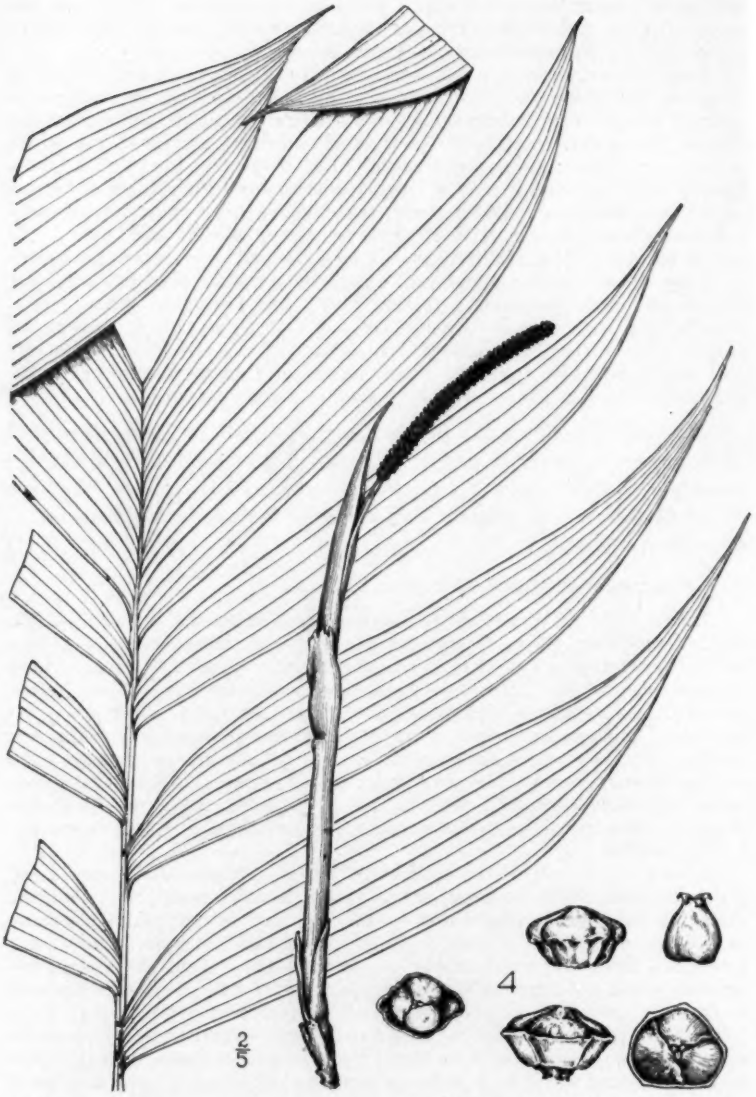
Very slender, canes 1–2 cm. thick, ringed at intervals of 2–8 cm., plant 2 m. tall: leaf-blade 50–90 cm. long, bearing 16–24 alternate or subopposite pairs of very narrow glabrous many-nerved straight pinnæ; petiole slender, angled, 12–14 cm. long above the tight closed finely striate sheath which is 18–20 cm. long; pinnæ light green, thin, 20–25 cm. long and 1–2 cm. broad, tapering regularly to a long slender point which is often broken away, somewhat narrowed to base, standing 2–3 cm. apart on the very slender flattened rachis, with straight prominent midrib and several side nerves close together: pistillate spadix composed of about 6 orange-colored branches or rachillæ 6–12 cm. long issuing from a rachis only 4 or 5 cm. long, the slender reddish-orange peduncle 14–15 cm. long that bears 3 or 4 sheaths that soon become shreddy and fall at fruiting time and leave the ringed scars of their attachment: fruit globular, 7–9 mm. thick when dry and deeply wrinkled from the shrinking of the thin flesh, green or olive-green when fresh; cupule small, 4–5 mm. in expansion, deeply lobed.

Chiriqui, Panama: valley of the upper Rio Chiriqui Viejo, vicinity of Monte Lirio, 1,300–1,900 m., *R. J. Seibert 218* (type, Mo. Bot. Gard.); vicinity of Callejón Seco, Volcán de Chiriqui, altitude 1,700 m., *Woodson & Schery 502*, and by others. This is one of the plants mistaken for *C. costaricana*, Oersted.

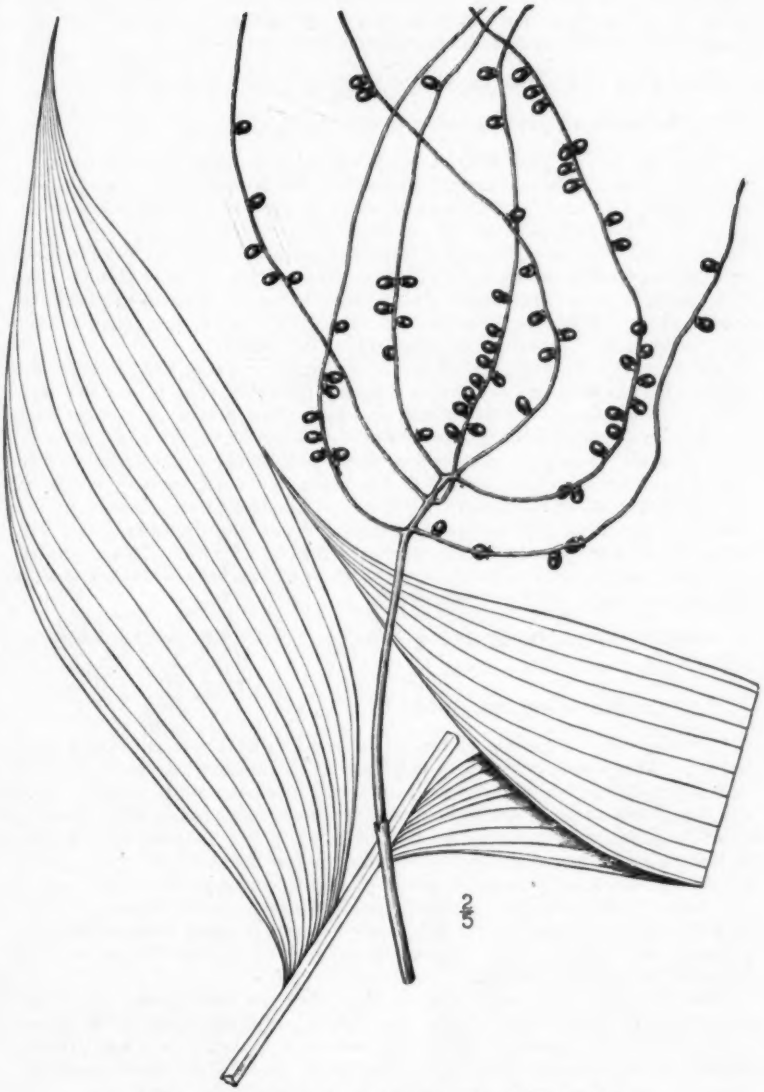
† **Chamædorea Allenii,** spec. nov. Fig. 126.

Erecta, ad 2 m. alta: folia regulariter pinnata, glabra, costata, aliquid nitida; lamina 60–70 cm. longa; petiolus 30–35 cm. longus super vaginam, carinatus et striatus, 5–7 mm. latus; pinnæ circa 9 jugæ, alternæ vel subopositæ et non plus quam 3 vel 4 cm. inter se distantes, 25–30 cm. longæ, 3–6 cm. latæ, angusto-lanceolatæ, non sigmoideæ, acute acuminatæ vel caudatæ, prominenter circa 9-costatæ, pinnæ terminales confluentes: spadix solitaria simplex densa spica circa 8 cm. longa; pedunculus circa 24 cm. longus, omnino inclusus 4 vel 5 laxis vaginis; flores pistillati lutei, octomeri, valde compacti, plus vel minus immersi; calyx non profunda integra cupula; petala 3, stricte includentia ovarium; styli 3, magni, exserti, reflexi, sessiles.

Erect, 2 m. tall: leaves uniformly pinnate, blade 60–70 cm. long, glabrous, firm in texture, more or less glossy; petiole about 30–35 cm. long above narrow sheath, ridged and striate, 5–7 mm. broad; pinnæ alternate or subopposite, about 9 pairs, equally spaced and not more than 3 or 4 cm. apart, terminal pair confluent, 25–30 cm. long, 3–6 cm. broad, narrow-lanceolate and not sigmoid, somewhat narrowed to base, acutely acuminate to caudate, prominently about 9-ribbed, main ribs 4–7 mm. apart, light colored and pronounced on under surface, nearly confluent at base: spadix a single simple very dense spike about 8 cm. long at anthesis, on a peduncle 24 cm. long and which is completely contained in about 4 loose sheaths of which the uppermost is projected 3–4 cm. with an acuminate herbaceous end; pistillate flowers in 8 rows, bright yellow, so closely placed as to appear to be immersed in the rachis; calyx a shallow more or less undulate but not



126. LEAF, SIMPLE SPADIX, PISTILLATE FLOWERS of *Chamædorea Allenii*. Details show the 3-lobed ovary in the corolla-cup.



127. SLENDER SPADIX, PART OF LEAF of *Chamædorea lucidifrons*.

lobed cup in which loosely sits the 3 introrse petals inclosing the conic more or less 3-lobed ovary on which the 3 spreading or reflexed prominent stigmas are sessile; staminate spadix and fruit not seen.

North rim of El Valle de Anton, Province Coclé, *Allen 1909*.

† **Chamædorea lucidifrons,** spec. nov. Fig. 127.

Gracilis, 2.5 m. alta: lamina 40–50 cm. et plus longa, lucida et glabra; rachis convexa in latere dorsali, carinata in latere superiore; pinnæ 30–35 cm. longæ, 6–9 cm. latæ, lanceo-oblongæ et prominenter sigmoideæ, angustatæ ad longum acumen vel caudam, 7–15 conspicuis costis 4–10 mm. inter se distantibus in medio et curvatis ad angustam basim: pistillata spadix simplicibus ramis, rachis brevis, circa 22 cm. longa et pæne 22 cm. lata; rachillæ 10–20 cm. longæ, glabræ, divaricatæ vel arcuato-ascendentes: fructus brevi-oblongus, obtusus, 5–6 mm. longus, 4–5 mm. crassus, non profundis rugis cum siccus; cupula brevis, lobi patuli.

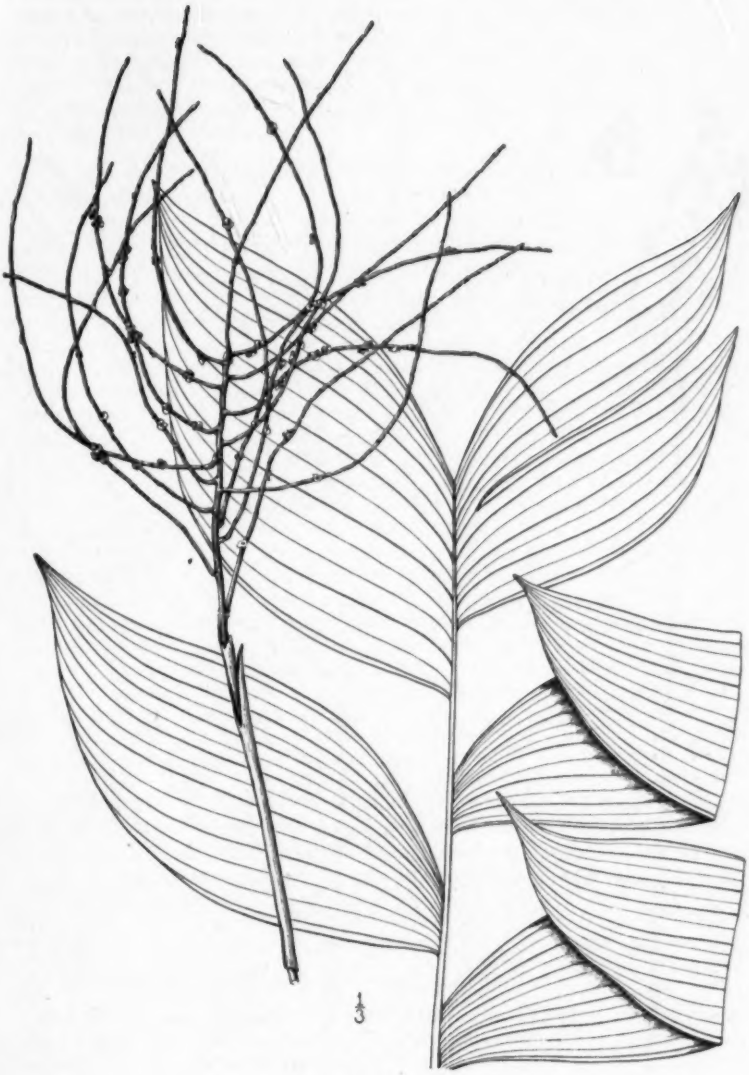
Slender, 2.5 m. tall: leaf-blade 40–50 cm. and more long, glossy and glabrous, with several very broad strongly ribbed alternate pinnæ; rachis convex on the back, lightly ridged on upper face; pinnæ 30–35 cm. long, 6–9 cm. broad, lance-oblong and strongly sigmoid, tapering to narrow point or to a cauda, with 7–15 conspicuous costa standing 4–10 mm. apart at the middle and prominently curved to the narrowed base, lucid particularly on the lower face: pistillate spadix once-branched from a short rachis, about 22 cm. long and nearly as broad, the glabrous rachillæ 10–20 cm. long and divaricate or upwardly curved: fruit small, short-oblong, obtuse, 5–6 mm. long, 4–5 mm. thick, irregularly and shallowly wrinkled in drying; cupule small, the lobes spreading.

Vicinity of El Valle de Anton, Province Coclé, altitude about 600 m., *Allen 1814*.

† **Chamædorea latipinna,** spec. nov. Fig. 128.

Tenuis, 1 m. alta, folia glabra et lucida: lamina 30–50 cm. longa, pinnata, 2 lobi apicales latissimi et confluentes, aliæ pinnæ paucæ et alternæ; rachis gracillima, complanata, 2–3 mm. lata, carinata supra; pinnæ 25–30 cm. longæ, 10–13 latæ, persigmoideæ, abrupte contractæ ad breve acumen, basis latissima, multis validis curvisque costis 1 cm. vel plus inter se distantes, venæ intermediæ minus distinctæ, omnes basi pinnæ curvæ: spadix staminata simplicibus ramis a plus vel minus continuente rachide, 25–30 cm. longa et lata, rachillæ 18–25 cm. longæ et laxe floriferæ; flores staminati lato profunde lobato calyce; pistillata spadix aliquid minor quam staminata, circa 20 cm. longa et lata: fructus immaturus oblongus, contractus basi, obtusus, 10–12 mm. longus.

Slender, 1 m. tall, with smooth glossy foliage: leaf-blades 30–50 cm. long, pinnate, apical part with 2 very broad confluent lobes, other pinnæ alternate, few in number; rachis very thin and flattened, 2–3 mm. broad, ridged on top; pinnæ thin, 25–30 cm. long, 10–13 cm. broad, strongly sigmoid, rather abruptly contracted to a short point, base very wide, conspicuous because of several or many curved strong ribs 1 cm. or more apart and less distinct ones between: spadices once-branched from a more



128. DIFFUSE RACHIS, LEAF of *Chamædorea latipinna*.

129. Leaf, very small spadix, large cupule of *Chamædorea Hageniorum*.

or less continuing central axis; peduncle 25 and more cm. long, its length inclosed in striate sheaths; staminate spadix 25–30 cm. long and nearly as broad, the glabrous rachillæ 18–25 cm. long and laxly flowered; staminate flowers with broad deeply lobed lightly imbricate calyx; pistillate spadix somewhat smaller, the fertile part about 20 cm. across in either direction: fruit (immature) oblong and contracted to base, obtuse at apex, 10–12 mm. long, green in color.

Vicinity of Chiriqui Lagoon, Province Bocas del Toro, *H. von Wedel 2275* (Mo. Bot. Gard.).

† **Chamædorea Hageniorum,** spec. nov. Fig. 129.

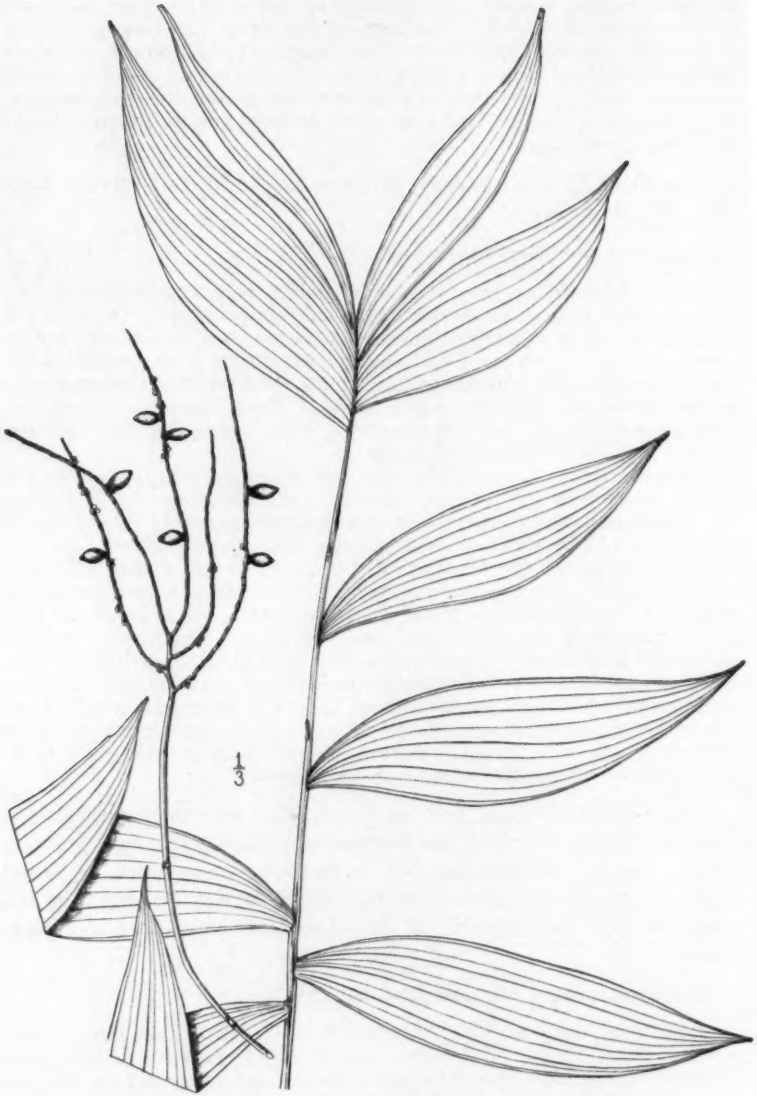
Parva, arboriformis, 1–1.5 m. alta, glabra, folia aliquid lucida: folia pinnata; lamina 35–40 cm. longa, 25–30 cm. lata; pinnæ alternæ, 5 vel 6 in utrisque lateribus, anguste oblongo-lanceolatæ, longi-acuminatæ vel alternæ, non sigmoideæ, 15–20 cm. longæ, 2–4 cm. latæ, 5 vel 7 pæne æqualibus nervis parallelis: spadix pistillata circa 3 brevium rachillarum ab apice gracilis pedunculi vaginati; sepala pistillati floris brevia, connata basi; petala multo majora, pæne vel admodum libera, imbricata, valde nervata, patula; pistillum oblongum, obtusum.

Tree-like, to 1 m. or a little more tall, glabrous, foliage more or less glossy: leaves regularly pinnate, the blade 35–40 cm. long and 25 or more cm. broad; pinnæ alternate, 5 or 6 on either side, narrowly oblong-lanceolate and gradually narrowed into slender tips, 15–20 cm. long, 2–3 cm. broad at middle or the terminal pair to 4 cm. broad, midrib not much stronger than the 2 or 3 parallel nerves on either side, all nerves converging somewhat toward base but the pinna not sigmoid; petiole 12–18 cm. long above the sheath, strongly ridged and angled as is the rachis: pistillate spadix small, of about 3 striate and angled erect glabrous rachillæ 7–8 cm. long from the top of a very slender peduncle that is inclosed tightly in about 3 sheaths of which only the uppermost has a foliaceous end; sepals of pistillate flower very short and connate at base; petals much larger, nearly or quite free, imbricate, strongly nerved, pointed, soon spreading and chaff-like; pistil after fecundation short-oblong, obtuse.

Cloud-forest at 6,500 feet on Cerro Horqueta, Boquete region of Chiriqui, Panama, *Christine and Wolfgang von Hagen 2060* (type, Mo. Bot. Gard.). Readily distinguished by its narrowly long-pointed or almost caudate leaflets and prominent loose petals of the pistillate flower as well as by the short few branchlets of the inflorescence and lack of continuing rachis.

† **Chamædorea Wedeliana,** spec. nov. Fig. 130.

Gracillima, ad 3 m. alta: laminæ folii 40–50 cm. longæ, tenues, lætevirentes supra et infra, bilobatæ apice et lobi imperfecte divisi; pinnæ alternæ, 3–9 cm. distantes inter se in rachide, lanceolatæ vel lato-lanceolatæ, sigmoideæ, 16–22 cm. longæ, 3–6 cm. latæ, aliquid angustatæ ad basim, graciliter acuminatæ, valde 4–5-costatæ; petiolus 6 vel 7 cm. longus super vaginam, 3–4 mm. latus, compressus: florens spadix 5 ramis, simplex,



130. SMALL SPADIX, LEAF of *Chamædorea Wedeliana*. Blank space on the rachis is natural.

rachillæ 12–15 cm. longæ, laxe floriferæ, glabræ; pedunculus 30–40 cm. longus, gracilis, compressus: fructus ellipsoideus, 12–14 mm. longus, 6–7 mm. crassus, angustatus ad utrosque fines, non sarcosus; cupula parva, striata intra.

To 3 m. tall, very slender: leaf-blade 40–50 cm. long, thin, bright green both sides, pinnate, terminal part bilobed at apex and imperfectly 2-pinnatisect on either side; pinnæ alternate and spaced 3–9 cm. apart on the rachis, lanceolate or broad-lanceolate or lanceolate and sigmoid, 16–22 cm. long, 3–6 cm. broad at middle, slenderly acuminate, considerably narrowed to base, strongly 4–5-ribbed and with indistinct veins between; petiole very short, about 6 or 7 cm. long above the sheath, striate, 3–4 mm. broad; rachis somewhat flattened, about 2 mm. broad: spadix slender and small; peduncle 30–40 cm. long, compressed, 3–4 mm. broad, bearing 5 or 6 sheaths; fruiting part terminal or nearly so, the rachis only 2–3 cm. long; rachillæ 5, slender, 12–15 cm. long, loosely flowered: fruit ellipsoid, 12–14 mm. long, 6–7 mm. thick, tapering both ways, not fleshy and scarcely roughened in drying; cupule 3-lobed, not greatly enlarged, lobes spreading and striate inside, often remaining on the rachis.

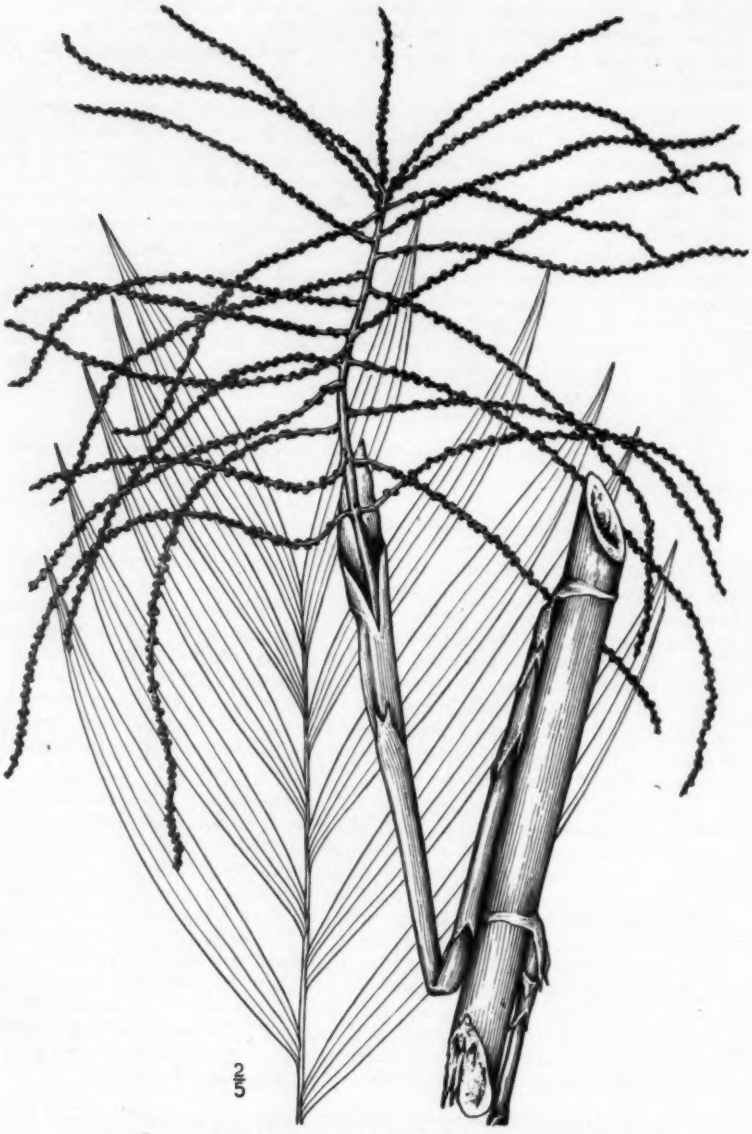
A "terrestrial shrub," Water Valley, Province Bocas del Toro, *H. von Wedel 719*.

† **Chamædorea linearia,** spec. nov. Fig. 131.

Gracilis, 3 m. plus vel minus alta, culmus circa 15 cm. crassus, annulatus, internodi 2–3 cm. vel plus longi: folia longi-pinnata; lamina 30–45 cm. longa, 20 cm. vel plus lata, glabra; pinnæ 15–20 jugæ sed compacte alternæ, 25–30 cm. longæ, 2–3 cm. latæ, longi-lineares, non sigmoideæ, acuminatæ et aliquid falcatæ; costa media prominentia, venæ laterales paucæ sed aliquid conspicuæ, venæ non aperte curvæ; petioli vagina 20 vel plus cm. longa, valde striata; rachis spadicis staminatæ 12–15 cm. longa, rachillæ circa 12 laterales et patulæ vel pendulæ et 10–12 cm. vel plus longæ; vaginæ pedunculi circa 5, vagina terminalis bractifera; flores staminati compacti, 1 mm. alti, petala valvata.

Erect, slender, more or less 3 m. tall, culm about 1.5 cm. thick, internodes 2–3 and more cm. long, rings prominent: leaves long-pinnate, blade 30–45 cm. long and 20 cm. and more broad, glabrous; pinnæ long-linear, alternate but close together, 15–20 or more either side the rachis, 25–30 cm. long, 2–3 cm. broad, not sigmoid but acuminate apices somewhat falcate, midrib pronounced and few side veins also noticeable, veins not clearly curved, base narrow and with nearly straight veins; petiole sheath 20 or more cm. long, strongly striate: staminate spadix with rachis 12–15 cm. long and about a dozen lateral slender glabrous spreading or drooping rachillæ 10–12 cm. or more long; peduncle 20–25 cm. long, sheaths about 5 of which the terminal one is open and with a conspicuous bract; staminate flowers closely placed, about 1 mm. high just preceding anthesis and somewhat broader; calyx a shallow nearly entire cup, 3 petals valvate.

Forests around El Boquete, Chiriqui, 1,000–1,300 m., *H. Pittier 2922* (U. S. Nat. Herb.).



131. LARGE SPADIX, TOP OF LEAF of *Chamædorea linearia*.

132. ENTIRE LEAF, TRUNK, SPADIX, PISTILLATE FLOWERS, DRIED FRUIT of *Chamædorea Pittieri*.

† **Chamædorea Pittieri,** spec. nov. Fig. 132.

Erecta, 60–100 cm.; caudex brevis, tectus basibus expansis petiolorum, tum plus vel minus nudus et 1 cm. crassus, annulatus: folia pinnata; lamina 25–30 cm. longa; petiolus 3–4 cm. longus, plano-convexus; pinnæ alternæ, anguste lanceolato-acuminatæ non sigmoideæ, 11–15 cm. longæ, 2.5 cm. vel minus latæ, lucidæ subter valde multi-nervatæ: pedunculus interfoliaris, 40 cm. longus, 3-vaginatus; pistillatæ rachillæ 2 vel 3, ascendentes, 10–15 cm. longæ, flores alterni; calyx parvus, lobatus pæne vel admodum ad basim; petala separata, imbricata, aliquid striata: fructus oblongus, obtusus, 1 cm. longus, 6 mm. crassus, aliquid carnosus extra, 3 micropylæ prominentes.

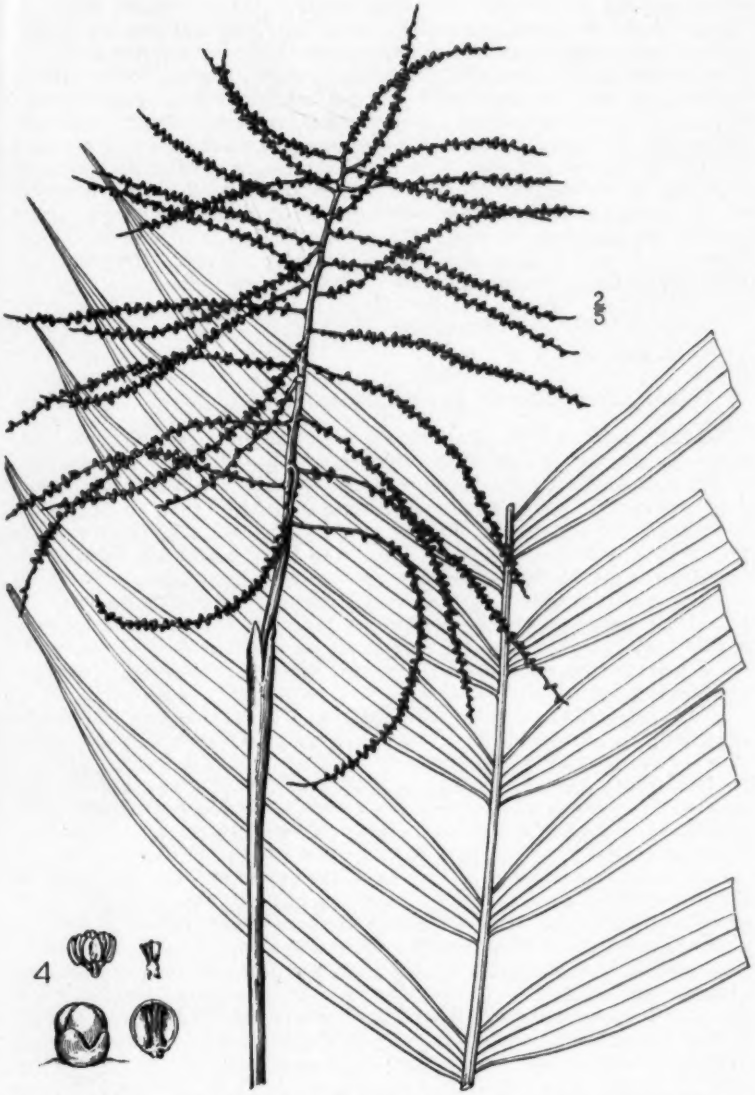
Erect, 60–100 cm. and perhaps more, the short caudex covered in the very expanded striate leaf-bases, at length becoming more or less evident from the falling of the leaves which cluster at the top of the thick stem and disclose strong rings 2–3 cm. apart, the culm itself about 1 cm. thick: leaves pinnate, glabrous or only minutely puberulent underneath, the blade 25–30 cm. long; petiole above the sheath very short, only 3–4 cm. long, stout, striate, grooved on upper face; rachis strongly ridged; pinnæ alternate, narrowly lanceolate-acuminate, not sigmoid, firm, somewhat glossy at least underneath, 11–15 cm. long, 2.5 cm. or less broad at middle, long point sometimes almost caudate, tapering gradually to base, prominently and strongly many-nerved, the midrib usually not pronounced the whole length: peduncle arising from a central or upper axil, often 40 cm. long, slender, closely sheathed in 3 bracts; pistillate rachillæ 2 or 3, erect or ascending from top of peduncle, 10–15 cm. long, alternately flowered; calyx small, lobed nearly or quite to base; petals separate, imbricate, somewhat striate: fruit oblong, obtuse, about 1 cm. long and 6 mm. broad, the soft thin exterior drying into more or less longitudinal lines, 3 micropyles prominent near basal end; cupule small, of flaring lobes.

Chiriqui, Panama. Southern slope of Cerro de la Horqueta, about 1,700 m., *H. Pittier 3169* (type, U. S. Nat. Herb.), *3168;* rain forest, Bajo Chorro, Boquete District, 6,000 feet, *M. E. Davidson 188.* A well-marked species in its very short petioles that are markedly expanded at base, narrow long-pointed strongly nerved pinnæ, few short rachillæ at top of very long axillary peduncle, fruit with prominent micropyles.

† **Chamædorea Scheryi,** spec. nov. Fig. 133.

Pæne acaulescens: laminæ circa 1 m. longæ, 18–20 oppositis vel subopositis jugis falcatarum vel sigmoideo-lanceolatarum pinnarum; petiolus 30 vel plus cm. longus, glaber, sulcatus; pinnæ 20–25 cm. longæ, 3–4 cm. latæ, costa media prominens subter, 2 venæ minores in utroque latere et inter eas nervi indistincti, apex acuminatus vel pæne caudatus, basis angusta sed venæ vix curvæ: spadix staminata diffusa, circa 25 cm. longa et lata, rachillæ circa 25 et divaricatæ vel pendentes compactis floribus; pedunculus 50 cm. vel plus longus, involutus 5 valde striatis vaginis; gemmæ staminatæ 1–2 mm. altæ, abrupte brevi-acuminatæ, petala valvata.

Low, nearly stemless: leaf-blades long-pinnate, about 1 m. long, bearing 18–20 opposite or subopposite pairs of glabrous much ribbed



133. DIFFUSE SPADIX, PART OF LEAF, STAMINATE FLOWER of *Chamædorea Scheryi*. Pistillode at upper right, in the detail.

pinnæ; petiole 30 or more cm. long, much ribbed or ridged, glabrous; pinnæ falcate or sigmoid-lanceolate, 20–25 cm. long and 3–4 cm. broad, midrib pronounced on upper surface, 2 minor ribs either side and indistinct nerves between, apex slenderly acuminate to almost caudate, base narrowed to about one-half the usual width but ribs hardly curved, the pairs standing 3–4 cm. apart on the thin flattened rachis: staminate spadix ample and diffuse, the flowering part about 25 cm. long and broad, consisting of a continuing central glabrous rachis and perhaps 24 slender divaricate or drooping simple rachillæ 10–15 cm. long and closely flowered; peduncle 50 cm. or more long, erect, slender, inclosed in about 5 strongly striate sheaths the upper one of which has a short acutely bifid end; staminate flowers 1–2 mm. long in full bud, divaricate, abruptly short-pointed, calyx 3-lobed and spreading, petals valvate.

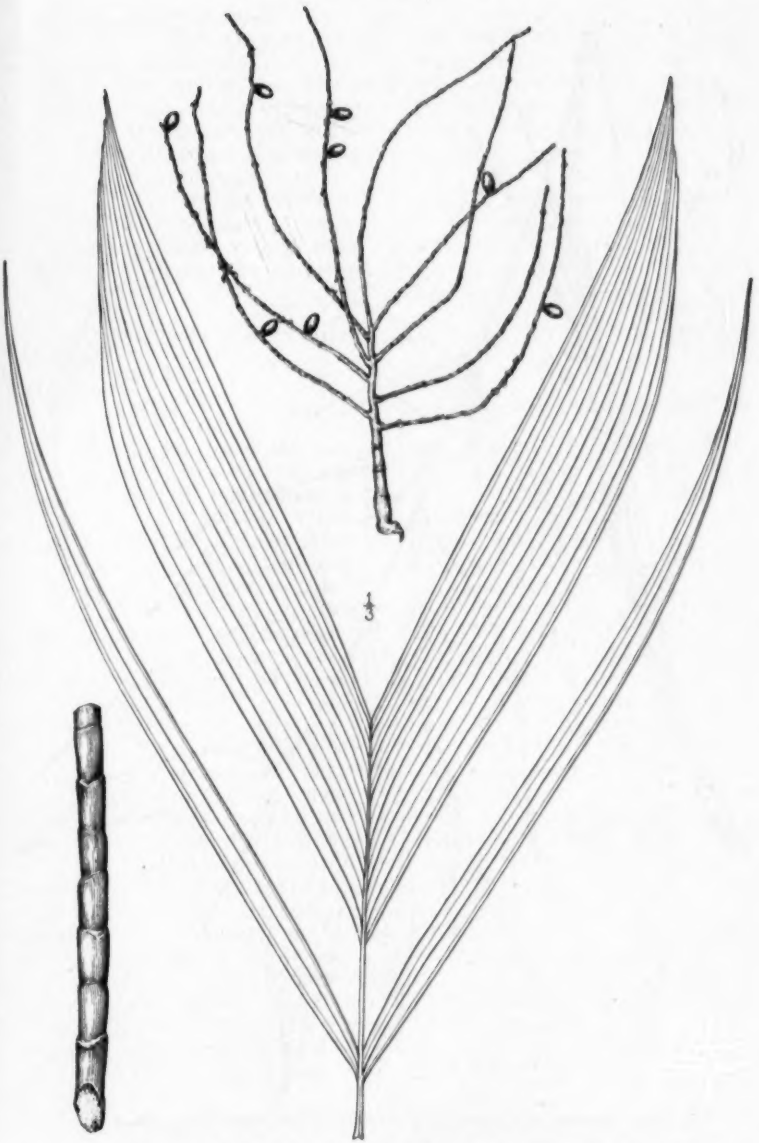
Chiriqui: vicinity of Bajo Chorro, altitude 1,900 m., *Woodson & Schery 680* (Mo. Bot. Gard.).

† **Chamædorea falcaria,** spec. nov. Fig. 134.

Gracillima, circa 3 m. alta; truncus 1–1.5 cm. diam., annuli circa 2 cm. distantes inter se: lamina 75–80 cm. longa, juga pinnarum latarum basi et alia juga apice, et inter eas circa 5 jugæ angustiorum pinnarum; vagina petioli 20–25 cm. longa, angusta multi-striata; rachis circa 40 cm. longa, complanata, carinata supra, plus vel minus furfuracea; infimæ et apicales pinnæ 30–40 cm. longæ, 5–6 cm. latæ, apex falcatus sed non sigmoideus, non angustatus ad basim; costæ 5 vel 6 et 6–10 mm. inter se distantes, tenuiores venæ inter eas, venulæ transversæ supra, costæ non curvæ basi pinnarum; pinnæ intermediæ 1–4 cm. latæ, falcatæ super medium: pistillata spadix simplicibus ramis a rachide continua; rachillæ 9–10, circa 12–16 cm. longæ: fructus oblongus, 9–10 mm. longæ et 5 mm. crassæ, pæne obtusus apice; cupula minima.

Very slender, about 3 m. tall; trunk 1–1.5 cm. thick, rather closely irregularly ringed: leaf-blade 75-80 cm. long, with a pair of broad pinnæ at base, another pair at apex and about 5 pairs of narrower ones between; petiolar sheath 20–25 cm. long (perhaps more), narrow and close-fitting, many-striate; rachis about 40 cm. long to base of upper bilobed part, flattened but slightly ridged above, more or less furfuraceous; lowest and apical pinnæ about 30–40 cm. long and 5 or 6 cm. broad, narrowed to long slender point, not sigmoid but falcate in the upper half, not narrowed nor the ribs curved to base, stoutly marked by 5 or 6 ribs 6–10 mm. apart with noticeable finer veins between, cross-veined on upper surface, practically glabrous on both faces; intermediate pinnæ 1–4 cm. broad, falcate above the middle: fruiting spadix simply branched from a continuing rachis, about 20 cm. long and broad, the glabrous rachillæ 12–16 cm. long; peduncle 4–5 cm. long, with about 3 joints where spathe-bracts have fallen: fruit oblong, 9–10 mm. long and 5 mm. thick, glabrous, nearly obtuse at apex, indistinctly striate when dry; cupule very small.

Hills north of El Valle de Anton, Province Coclé, Panama, about 800 m. altitude, *Allen 2949.*



134. SPADIX, SECTION OF TRUNK, TOP OF LEAF of *Chamædorea falcaria*.

135. The specimen in Copenhagen on which *Chamædorea Pacaya* was based.

136. LEAF AND SPADIX of *Chamædorea flavovirens*. Fruit is nearly full size.

Clarification of Chamædorea Pacaya. In 1854 Oersted described this species from Costa Rica, applying to it (although without explanation) the vernacular native name. The species has been misunderstood and erroneously defined. Photograph of Oersted's specimen by the Field Museum enables us at last to clarify the situation: Fig. 135. One notes the slenderness of the plant, the few very narrow long-pointed only slightly sigmoid pinnæ, the small pistillate inflorescence. I match this plant very well by recent collections in Costa Rica and contiguous Panama.

From central Panama Paul H. Allen sends me a plant (Fig. 136) very like *C. Pacaya*, but it is undoubtedly *C. flavovirens*, Wendl., heretofore a palm without a country. Differences between the two palms are apparent in the much broader strongly sigmoid less pointed and more sparsely nerved pinnæ of *C. flavovirens*, as well as in the inflorescence.

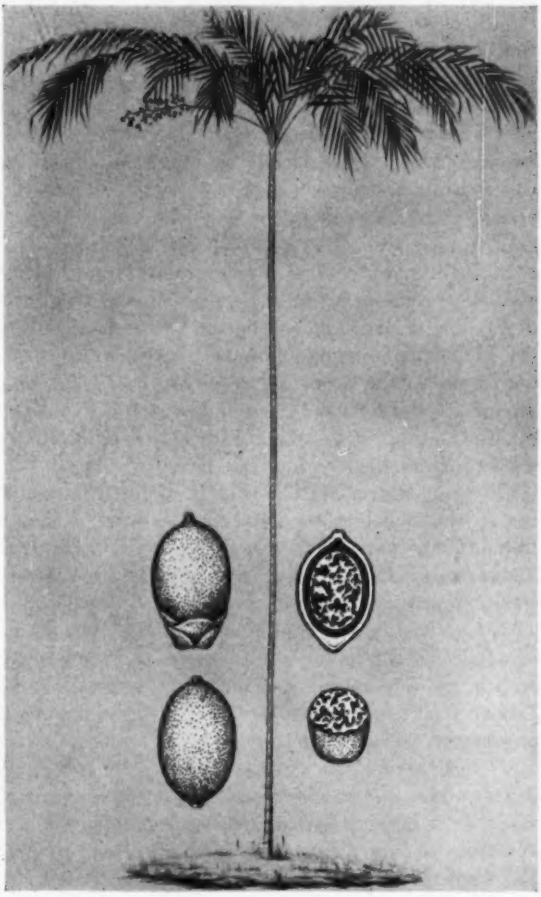
Acceptance of the species *C. flavovirens* raises several important questions. Wendland refers the plant to Chamædorea with a question mark and he states that inflorescences had not been seen by him, the character having been drawn from vegetative parts. That was in 1854. In 1859, however, Oersted describes the inflorescence of *C. flavovirens* and says that he saw specimens from Herrenhausen, Wendland's place. Two photographs of apparently authentic specimens from Herrenhausen in the Field Museum collection identify the plant for me; I assume they are the specimens seen by Oersted, and that they were taken after the original description was drawn. The species has been known only from material cultivated by Wendland, the supposition being that it is native in New Grenada (Colombia) or Central America. Dugand, however, does not list it in his Palmas de Colombia: Caldasia no. 1, 1940. Burret reviewing the case in 1933 supposes *C. flavovirens* to be the same as *C. Pacaya*, in which case the latter name would fall.

The word Pacaya is a native vernacular applied to several palms and sometimes to other trees or their parts. As applied to palms it "apparently is restricted to Central America," as stated recently by O. F. Cook. He prefers, however, to restrict the vernacular Pacaya to a larger palm of Verapaz, Guatemala; regretting application of the name to the small southern species Cook renames the Costa Rican palm *Chamædorea Oerstedi*, and *C. Pacaya* of Oersted becomes a synonym. (Nat. Hort. Mag. xviii, 168, July 1939). For the Guatemalan Pacaya he erects a new genus, Edanthe, and the species becomes *E. veræpacis*. Under this disposition no palm may bear the name *Chamædorea Pacaya*.

REINHARDTIA—MALORTIEA

Lately the genera Reinhardtia and Malortiea have been combined, and all the Malortieas become Reinhardtias. Fortunately the species are few. We may now examine this situation.

Reinhardtia was founded by Liebmann in a letter from which Martius published in 1849. The usual reference cited for the genus is 1845 (or 1846) to a contribution by Liebmann in a Danish publication, but it is only a *nomen* and does not possess taxonomic standing. No statement is made in either place on the origin of the generic name. One species, *R. elegans*, from southern Mexico, was then described in Martius. Little material has been available of *R. elegans*, and it apparently has been imperfectly understood. Recently, however, we have had photographs of Liebmann's specimens at Copenhagen as well as of the drawings in his unpublished Icones (page 186), through the cooperation of the Field Museum of Natural History in Chicago; we also have a photograph of Wendland's material of Malortieas although those species have not been in doubt.



137. TREE AND FRUITS, LATTER SOMEWHAT ENLARGED, of *Reinhardtia elegans*, from Liebmann's pictures.

Liebmann's account of *Reinhardtia elegans* in Martius calls for an erect tree 20 feet tall with a terminal crown of long spreading pectinately-pinnate leaves with linear attenuate-pointed pinnæ, spadix 3 feet long and

doubly branched, albumen strongly ruminate. The tree and fruit, made up from Liebmann, are shown in Fig. 137. All this is very unlike the plants we know as Malortiea.

The genus Malortiea was founded by Wendland in Otto & Dietrich's Allgemeine Gartenzeitung, xxi, 25, 145, in 1853, dedicated to Dr. Ernst V. Malortie, in the military service of the Kings of Hannover. There has been no doubt of the plants intended in this and other publications, one of which is shown in Fig. 138. All the Malortieas are little palms, often less than 2 feet high when in full flower or fruit, with divided or fenestrate strongly toothed leaves which are broader at apex than at base, the strong veining not strictly pinnate so that they could not bear a Reinhardtia type of foliage if the leaf were to be compound; inflorescence is simple, albumen plane.

In his treatment of the genera of palms in Die Natürlichen Pflanzenfamilien, 1889, Oscar Drude combines Malortiea with Reinhardtia, but this combination is protested on the basis of very dissimilar evident characters of the two genera by Udo Dammer in 1901 (Gard. Chron. ser. 3, xxix, 341, in discussion of *Malortiea Koschnyana*.) About ten years ago Max Burret made critical examinations of flowers and fruits of the different species, correcting errors in former accounts (Notizblatt, xi, 551, 1932), and followed Drude in uniting the two genera. Subsequent availability of the Liebmann drawings, however, presents an aspect of the case that is hardly obtainable from dried specimens. The fact appears that the two groups are incompatible. The unlikenesses between them are much more significant than certain similarities (or lack of contradiction) under dissection. Note Figs. 137 and 138.

Relationship of Reinhardtia is apparently with the Euterpe group, but it cannot belong to that genus because of lack of crownshaft on the tree and the many stamens. The straight basifixed anthers (as shown in Liebmann's detail drawings) take it away from Geonoma, and the monœcious character separates it from Chamædorea. Drude places it in the group with Chamædorea, Hyophorbe, Gaussia, Pseudophœnix, Synechanthus, but these things have little in common. Bentham & Hooker put Reinhardtia and Malortiea in a bracket by themselves in the great tribe Areceæ. Probably we shall dissociate the two genera more completely when we understand the plants better.

Genus Reinhardtia was based on a palm collected in southern Mexico. Burret added *R. gracilior* from British Honduras; I have not seen it. The two species *latisecta* and *gracilis* from Guatemala, as well as *simplex* and *Koschnyana* from Costa Rica, were all placed by Wendland in Malortiea and were transferred by Burret to Reinhardtia; I should restore them to Malortiea. *Reinhardtia rostrata*, Burret (in Ann. Naturhist. Mus. Wien, xli, 228, 1932, and Notizblatt, xi, 554, Dec. 1932), from Costa Rica, I now make † **Malortiea rostrata,** trans nov.

138. ENTIRE PLANT ABOVE THE ROOT, of *Malortiea simplex*. Fruits shown in detail.

WOODSONIA, A NEW GENUS

† **WOODSONIA**, gen. nov.

Geonomoidea, sed flores vix immersi, antheræ loculi non discreti: monœcii: folia pinnata, elongata: spadix simplex, erecta, 30–45 cm. longa, compactis floribus, pedunculus æqualiter vel plus longus; spatha major una, longa, vagina amplexicaulis, lamina longa angustaque ad apicem; flores ascendentes at aliquid imbricati, leviter immersi; flores staminati 6–7 mm. longi, curvi, acuti, striati, petala imbricata, calyx brevis et cupuliformis 3 lobis acutis, 6 stamina, filamenta non connata, antheræ lineari-versatiles, locella non separata, pistillodium columnare, trifidum; flores pistillati 3–4 mm. longi, pæne obtusi, sepala et petala lata et imbricata, striata, ovarium oblatum apice conicali, stylus nullus.

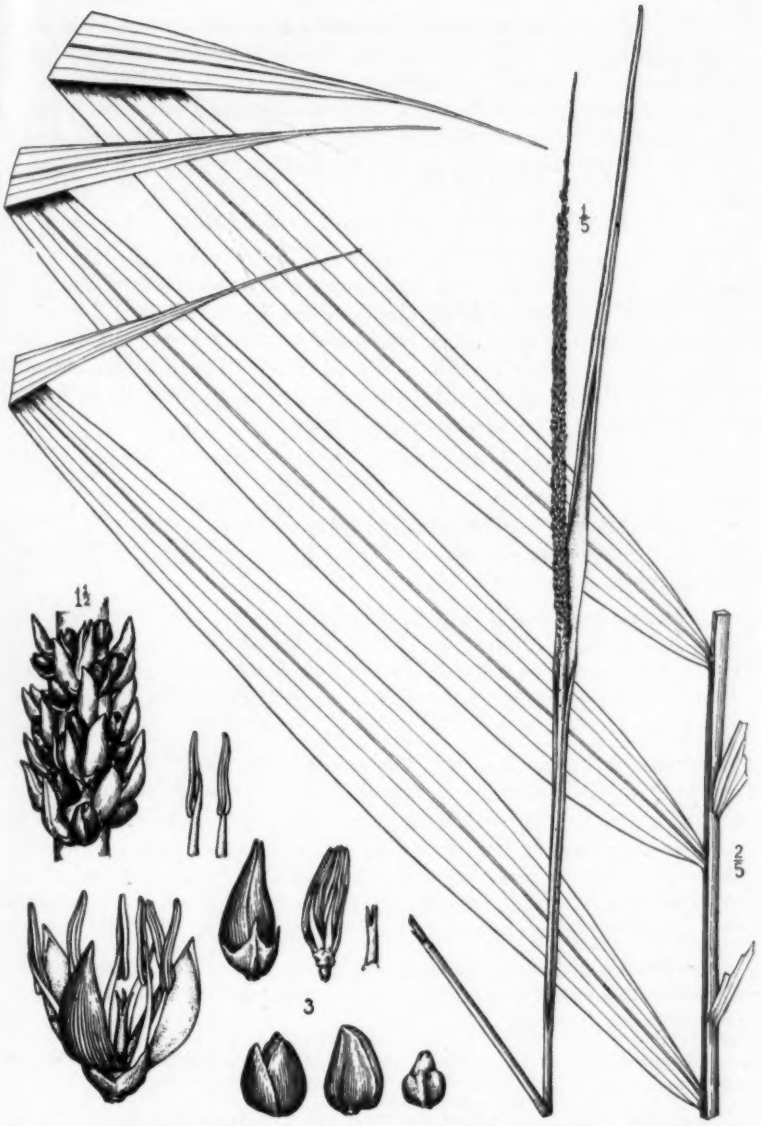
Geonomoid pinnate-leaved monœcious palm with chaff-like flowers in long narrow simple spadix like that of the grass Ammophila, the pistillate beneath or more or less between 2 pointed striate staminates, all of them only lightly immersed on the rachis; staminate flowers 6–7 mm. long in full bud, with short 3-pointed calyx cupulate at base, 3 long narrow pointed slightly imbricate petals free and hardly united at base, somewhat exceeded in anthesis by 6 long linear versatile conjoined anthers on separate filaments only moderately widened toward base, pistillode columnar with 3 pointed stigmas; pistillate flowers much shorter, envelopes imbricate and about equal in both series, ovary about 1.5 mm. long, somewhat oblate and narrowed into a conical part, style absent; albumen apparently ruminate.

† **Woodsonia Scheryi**, spec. nov. Fig. 139.

Erecta, 2–3 m. alta, inermis: lamina 1 m. vel plus longa; pinnæ 28–40, longo-lineares, acuminatæ, alternæ vel subopppositæ, 35–45 cm. longæ, 3–5 cm. latæ, pluribus nervis, costa media non valida; petiolus valde angulatus, plus vel minus quadrangulatus, sulcatus basi.

Erect, 2–3 m. tall: leaf-blade 1 m. or more long and 75 cm. broad with 14–20 long-linear pinnæ either side of rachis; pinnæ 35–45 cm. long, 3–5 cm. broad, tapering to long thin point, glabrous or perhaps minutely puberulent underneath, somewhat glossy, subopposite and alternate and sometimes missing, attached 5–10 cm. apart, midrib not very prominent and several side ribs nearly as strong and 5 mm. more or less apart; petiole 60–70 cm. long, expanded at base, narrowly grooved on upper face at lower end but becoming strongly angular and more or less four-sided: spadix 30–45 cm. long, 10–14 cm. thick, tapering to top, terminating a slender peduncle of equal or greater length, the main spathe a single tight sheath produced into a narrow blade that equals the inflorescence; flowers compactly placed, white, becoming stramineous, the buds at anthesis having an upright or ascending direction and loosely imbricating; staminate buds at anthesis period 6–7 mm. long when dry, curved, prominently pointed; pistillate buds at same period 3–4 mm. long and hardly pointed.

Vicinity of San Bartolomé, peninsula de Burica, Province Chiriqui, Panama, 0–50 m. altitude, *R. E. Woodson, Jr. & R. W. Schery 894*, collected July 28-August 1, 1940. Further studies of this palm are required.



139. LEAF, GRASS-LIKE SPADIX, FLORAL DETAILS of *Woodsonia Scheryi*. Details show part of rachilla with both sexes of flowers, not sunken, staminate flower and its parts, and at bottom in three items the pistillate flower and pistil.

This palm, *Woodsonia Scheryi*, reminds one at first sight of Taenianthera, particularly of *T. acaulis*, Burret (*Geonoma acaulis*, Martius) but is separated at once by the very different anthers and the flowers superficial. It has the look in flowers of some of the Cocos segregates but is distinguished at a glance by the simple unbranched spadix and the lack of durable double cymbas or boat-like spathes, as well as in stature, habit and lack of woody structure.

TERMS

In the continuing study of palms it has been necessary to invent new terms for some of the parts and structures for purposes of clearer diagnosis. These terms are to be published elsewhere but the consultant will be aided if they are entered here, along with some of the older ones. The whole subject of terminology in palms is in need of careful overhauling, but prerequisite to this reformation are contemporaneous studies in the comparative morphology of the structures and organs.

Coma (Latin *coma*, head of hair). The leafy head or crown of a palm tree.

Costapalmate. Structure of a palmate leaf in which the petiole continues nearly or quite through the blade, as in many species of Sabal and in some of the Livistonas.

Crownshaft (*culmen superius*). The apparent extension of the trunk or main caudex above the spadices and on the top of which rests the head of leaves, well marked in Roystonea and Euterpe. This shaft is not a woody caudex, however, but is composed of long sheathing leaf-bases and the inclosed long terminal bud.

Cymba (Latin *cymba*, boat). A woody durable spathe or spathe-valve, that at first incloses the inflorescence or spadix and later persists as a covering organ. Cymbas are particularly developed in the Cocoineæ, as in Cocos, Arecastrum, Syagrus, Bactris, Acrocomia, Attalea, Scheelea, and in Roystonea. Usually the cymbas are two to each inflorescence or spadix, one of which falls before full anthesis and is often overlooked, and the secondary larger one that persists even until the fruit is ripe.

Nodifrond (*nodifrons*). Leafy bracts or "spathelets" at the nodes of an elongated inflorescence or spadix, as in Sabal, and in other genera not provided with cymbas.

Palman. Undivided or "solid" part of a palmate palm leaf, below the segments.

Rachilla. Small rachis; applied to the ultimate twigs or axes of a branched spadix, on which the flowers and fruits are borne.